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Perceptions of sustainability and their influence in the design and delivery of Scottish housing

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Declaration

I declare that this thesis has been composed solely by myself and that it has not been submitted, in whole or in part, in any previous application for a degree. Except where states otherwise by reference or acknowledgment, the work presented is entirely my own.

Alastair Oliver

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Abstract of Thesis

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Degree sought:	PhD	No. of words in the main text of thesis:	71,000
Title of thesis:	Perceptions of sustainability and their influence in the design and delivery of Scottish housing		

The sustainability 'agenda' is expected to be firmly embedded in the policies and practices of the Construction Industry. A multitude of sustainability indicators and the concurrent development of different Assessment Methods, intended to direct and inspire designers towards sustainable practices, emerged in the late 20th and early 21st Century. In the UK and the domestic sector in particular, many of these indicators have now been subsumed by the Building Regulations and Standards, which set the minimum levels of achievement for 'sustainability'. Each of these approaches are underpinned by a particular understanding or interpretation of the best way to meet a perceived set of sustainability needs. This situation raises questions surrounding how notions of sustainability and sustainable development are assimilated and interpreted by Industry Professionals. These questions revolve around how a designer perceives sustainability and how this influences their personal design approach. However, one issue that persists is the lack of a shared sense or understanding of what sustainability is and why it is important to our industry and society.

In order to explore the breadth of perception within the domestic housing sector in Scotland, a series of semi-structured interviews with designers have been thematically analysed. This research reveals that there are clear elements visible of a shared goal of working towards sustainability amongst designers. It also confirms that the level of understanding around sustainability practices and procedures among designers is diverse and not clearly understood across the profession. Further to this, the thematic analysis led to the development of five themes form the data: 1) Perceptions of cost, 2) Perceptions of the Building Standards, 3) Perceptions of Technology, 4) Perceptions of the Profession and 5) Perceptions of knowledge and Understanding.

The outcomes of this study will be beneficial in several ways – they will contribute to the understanding of sustainability practices within the domestic housing sector; knowledge dissemination via guidance and design guides could help limit the variability of approaches of design teams; the understanding developed will allow a more informed approach to policy development and, finally, they will provide invaluable insight for the further development of the educational and continuing professional development needs of Architects in particular.

Lay Summary of Thesis

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The sustainability 'agenda' is now encountered in most areas of everyday life and the construction industry is no different. Sustainability goals are in place for the industry so that it can contribute to climate change efforts aimed at the reduction of Carbon Dioxide emissions and other positive environmental effects. One problem that has been identified, is that that sustainability is sometimes a complex, confusing and disputed subject and it is difficult to know exactly what people think about it.

In Scotland the sustainability goals for the construction industry are going to be achieved via the Building Standards, which set the minimum standards for how a building must perform while it is in use. In a similar way to the concept of 'sustainability', it is also difficult to know what people think about the Building Standards and the way that they are trying to meet the performance targets.

To investigate these problems, this research included the interviewing of 21 house designers in Scotland to find out more about what they think about sustainability, the Building Standards and any other related topics that might come up. This resulted in 5 themes being developed from what the architects said, and recommendations have been made based on this.

These recommendations suggest things that can be done by Government, Educators and Professional Membership bodies that can improve the way the Building Standards are developed and also improve the situation for designers and how they are educated and trained.

CHAPTER ONE
INTRODUCTION

'There are two problems for our species' survival - nuclear war and environmental catastrophe - and we're hurtling towards them. Knowingly'

Noam Chomsky (2013)

1.1 Background

The Construction Industry in the UK is facing a challenging situation. It consumes around 400 million tonnes of construction material each year (BRE, 2012), generates around 120 million tonnes of waste (Construction, demolition, excavation)[1], [2] and is currently associated with around half of the UK's carbon emissions directly. (Department for Business Innovation and Skills, 2010) The ambitious target now set for the UK requires an effective 100% reduction by 2050 vs 1990 levels[3] to contribute in efforts to combat human induced climate change. Yet, at the same time, the Construction Industry is being told it needs to substantially increase output to deliver vast amounts of additional housing. Osmani and Davies (2013) reported this as being the provision of an estimated 240,000 new dwellings in the UK annually - just to meet demand. Since then, various other figures have been touted as being what is *really* needed – whether that is the 300, 000 additional homes (HM Treasury, 2017) or 240 – 340,000 additional homes (Wilson and Barton, 2018) that is now apparently needed in England alone each year to meet demand, the National Records of Scotland forecast of 450,000 extra homes that will be needed in Scotland by 2033 (Scottish Government, 2013), the six or eight 'major new communities' judged by the Royal Institute of Chartered Surveyors (RICS) in 2014[4] to be needed in Scotland or the 25-30,000 houses now reportedly needed for Scotland each year according to the RICS in 2019[5]. What is clear, however, is that there is a strong message of both increased *demand* and therefore the requirement for much increased provision. Without careful management, though, this may only result in increased emissions, material consumption and waste.

More broadly, and although often controversial, there can be little doubt as to the

[1] UK Green Building Council Construction resource statistics: https://www.ukgbc.org/resource-use/ (accessed 31 July 2019)
[2] The UK Green Building Council also note that 'there is no recent data on total materials used in construction by type and by source': UKGBC Resource Statistics Page: https://www.ukgbc.org/resource-use/ (accessed 31 July 2019)
[3] UK Government Press Release about changes to 2008 Climate Change Act: https://www.gov.uk/government/news/pm-theresa-may-we-will-end-uk-contribution-to-climate-change-by-2050 (accessed 31 July 2019)
[4] Reported on the BBC website 31st July 2014 https://www.bbc.co.uk/news/uk-scotland-scotland-politics-28580086 (accessed 31 July 2019)
[5] Reported on *The Scotsman* website on 16th January 2019 https://www.scotsman.com/business/companies/retail/alternative-ways-to-build-scottish-housing-needed-to-hit-targets-1-4857614 (accessed 31 July 2019)

anthropogenic impact on the earth's ecosystems. Whether that be climate change, environmental pollution (in its various guises) or natural resource and mineral depletion, human activity is a significant contributing factor for much of it and, in all likelihood, only by achieving substantial changes to human activity will there be an altering in the course that has been set.

Notions and aspirations towards 'Sustainability' and 'Sustainable Development' have therefore come to the fore in recent years and this is acutely felt in the Construction Industry, since it has such significant potential to influence positive change. One way that this can be done is by driving the evolution of 'best practice' into a 'business as usual' approach, as highlighted by Murtagh *et al.* (2015), reflecting on the findings of the Intergovernmental Panel on Climate Change report from 2014 (IPCC, 2014). This has often proved to be difficult to implement in practice, and 'traditional' or long established construction materials and practices, for example, often persist (Murtagh *et al.*, 2016) in their usage – in preference over the adoption of Modern Methods of Construction or more advance construction materials, products and practices, and these are factors considered by Myers (2005), Kibert (2007) and Monahan and Powell (2011)

Unfortunately, both 'Sustainability' and 'Sustainable Development' are becoming increasingly difficult terms to both define and apply due to their widespread use, interchangeability and seeming ubiquity in various spheres of both society and industry. Simply stated, sustainability might be understood as an ability to sustain or maintain an activity but, in reality, it is considerably more complex than this and can be interpreted in a variety of different ways and this will be explored further in Chapter 2: *Context*.

Further to this, there can often an unhelpful emphasis on the environmental component of sustainability at the expense of the social and economic components that are often understood to be either an equal partner or competitor to environmental sustainability and this, again, will be looked at more closely in chapter 2. It is also possible that if misunderstandings continue to surround 'sustainability' issues, other critical and longer-term aspects of sustainability may be overlooked for what may

prove to be short term achievements. By extension, what is also clear is that even if an 80% or even a 100% emissions reduction is achieved, for example, without other *systemic and paradigmatic* shifts in construction practices and, indeed, society at large, there is no guarantee that either industry or society will have moved towards a pathway to sustainability, under almost any definition.

A response to the needs of the sustainability 'agenda' in recent years has been the development of a multitude of different 'Assessment Methods' (Brandon and Lombardi, 2011) and models that are designed, in a variety of ways, to direct, drive, constrain and inspire designers towards more sustainable practices. Each of these methods or tools is, in turn, underpinned by a particular understanding or interpretation of the best way to meet a perceived set of sustainability needs. Usually, this involves the weighting of different factors, groups of factors or metrics - referred to as *indicators* - according to their particular context or locality and some elements may also rely on the output from a type of Life Cycle Assessment or Analysis. Since the early 1990s the assessment method approach has made a significant impact on Building Regulations (termed the Building Standards in Scotland) (Schweber, 2013), which have now become the regulatory vehicle by which a building is assessed throughout the UK by mandating the minimum standards that must be met by a building; albeit slightly differently in Scotland from the rest of the UK.

In the UK, the Climate Change Act of 2008 (UK Parliament, 2008) originally stipulated that all new domestic buildings in England would be 'zero carbon' from 2016, although these targets underwent major revision in March 2015, including the deprecation of the Code for Sustainable Homes (Pretlove and Kade, 2016) in favour of the Building Regulations[6] which, again, will be considered further in Chapter 2. In Scotland, there are legally binding targets in place via the Climate Change (Scotland) Act of 2009 (Scottish Parliament, 2009) and the Scottish approach is largely supported by the report entitled 'A Low Carbon Building Standards Strategy for Scotland', widely referred to as 'The Sullivan Report' of 2007 (and a further update to the report in 2013)

[6] Guidance note announcing winding down of the Code for Sustainable Homes: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/315504/250414__Code_Addedum_2014_Combined_Final_V10.pdf (accessed 31 July 2019) and Announcement from BRE on the Housing Standards Review decisions: https://www.bre.co.uk/housing-standards-review (accessed 31 July 2019)

(Scottish Ministers & Sullivan (2007, 2013) which outlines recommendations, aspirations and processes for the construction industry in Scotland and has provided much of the basis for Sections 6 (Energy) and 7 (Sustainability) of the Building Standards in Scotland.

While the current UK Government appears to be moving away from implementing the zero carbon targets in their original form in England and Wales, the Scottish aspirations remain in place as articulated in the Sullivan Report, and stipulated by the Building (Scotland) Act 2003 (Scottish Parliament, 2003) which require that the Building Standards in Scotland are implemented with the purpose of:

> *(a) securing the health, safety, welfare and convenience of persons in or about buildings and of others who may be affected by buildings or matters connected with buildings,*
> *(b) furthering the conservation of fuel and power, and*
> *(c)* ***furthering the achievement of sustainable development***

In chapters 2 and 6 there will be further discussion and analysis of some of the issues relating to the terminology used here, however, it remains that these are the requirements laid down in law for the Construction Industry in Scotland.

The achievement of this stated aim in the Scottish Building Standards will, in most cases, be delivered by construction Professionals and principally an architect or 'architectural designer' (Murtagh *et al.* 2016). These designers must marry the needs and wants of the client with the stipulations of the regulations and, if they are able to intervene early, they can often yield the greatest (environmental) benefit as suggested by Halliday (2008).

This situation raises several questions surrounding how notions of sustainability and sustainable development are assimilated and interpreted by Industry Professionals. These questions revolve around how an architect *perceives* sustainability and extend from discovering how far these perceptions influence their personal design approach through an assessment of what impact this has on their sustainability *literacy* (Higham and Thomson, 2015) and on to an understanding of the extent to which an architect or

designer's perceptions of sustainability influence their approach to meeting or surpassing the requirements of the Building Standards. This, then, may go some way to reveal how far the current 'system' is effective to deliver its stated aims.

Further to all that has been outlined up to this point, it is important to pass comment in these introductory words on how seriously – or not - these issues are being taken by the UK and Scottish Governments. There is certainly evidence of the right 'talk' being put forth, but it is not so certain whether, and to what extent the talk is developing into meaningful action. Indeed, it is also not clear whether any of this will successfully usher in some of the society-wide behavioural changes that must certainly take place if the climate and sustainability challenges are to be tackled effectively. This is evidenced in some apparent mis-matches that exist between government policy and practice such as pursuing air travel expansion, allowing for subsidy of fossil fuel industries or reducing subsidy and support for some parts of the renewable energy sector – all in the face of accepting or even joining in the chorus of declaring a 'climate emergency'. Different aspects of this will be explored in later chapters, but it is important to note at this point, when considering the role of government in pursuing sustainability, that there will ultimately be diminishing returns from policy that centres around efficiencies and off-setting – for example. Depending on the role and advancement of technology as will be considered in some detail in both Chapter Two and Six, policies that pursue and secure substantial behavioural change and a diversion from current 'business as usual' will be required.

1.2 Subject matter

There are some aspects to the subject matter of this research that will benefit from their definition and boundaries being clarified:

The principal subject is that of 'Sustainability' and, by association, 'Sustainable Development'. A notable proportion of this thesis will therefore be devoted to exploring the variety of themes and questions that arise out of these concepts. This will include a review of some the different definitions and understandings that exist, along with a consideration of how this might be best approached by construction industry

professionals, although there is **not** the intention to *develop* a new definition or identify which definition might be considered 'best'.

In addition to this, the Construction Industry and Industry Professionals i.e. Architects or 'Architectural Designers' will also be under consideration and both these subjects will be defined and expanded upon in Chapter 2: *Context and a Review of the Literature*.

1.3 Problem Definition and Communicating the Problem

Several problems may be presented in this field and this research project seeks to clarify what, as-yet unidentified or widely acknowledged or understood problems, features and contexts may exist.

One issue that may persist is the lack of a shared sense or understanding amongst professionals of what sustainability is why it is important to the Construction Industry and, indeed, to broader spheres of society too. It may be that there are disconnects between the education and expected competencies of designers once in the workplace, or there may be widespread distrust or misunderstanding of the regulatory instruments that are intended to enhance sustainability in the built environment. There are numerous scenarios that may emerge as this research is conducted to delve into the perceptions that designers hold and in doing so, it is anticipated that a rich narrative will emerge that outlines some of the problems and difficulties that exist for designers, which in turn will allow the development of appropriate solutions for the situations that are discovered.

Sustainability in the Construction Industry is now largely driven by the Building Standards, but these instruments were not originally designed or intended to deliver this. The Building Regulations were originally conceived to ensure the health and safety for those who build, occupy and demolish a building but increasingly in recent years they are being used to deliver other objectives too, with sustainability and sustainable development being a prominent example of this. While certainly being an expedient approach by government to embed sustainability in construction industry directives, it is not yet clear whether it is the most effective vehicle to deliver the advances and, ultimately, changes that are needed to achieve the goals and targets that have been set.

Further to this, is the situation reported by Giesekam *et al.* (2015) that

> *Whilst much research has focused on demonstrating the performance of alternative materials, authors have repeatedly noted a dearth of qualitative studies assessing the cultural, behavioural or perceptual barriers to adoption [of alternative materials] within design teams*

While this is specifically said of the adoption of alternative building materials, a review of the relevant literature shows that the same can be said of the issues that have been raised here, and that there is clearly the need for more qualitative research in this field.

Section 1.7, below, will introduce the aims and objectives for this research. However, they will be laid out *in full* at the end of Chapter 2: Context, as I am not yet willing – at this stage – to settle on the problem, aims and research questions before situating and considering the context for this research further.

1.4 What will the detriment be by not investigating this?

While there may not be any immediate negative consequences to the Construction Industry for not undertaking this research, there are considerable benefits to be gained from it. This research provides a valuable opportunity to explore issues that are crucial to the future success of the Industry and at a time when it is of the utmost value to improve our understanding of these issues. Sustainability is now firmly embedded in the regulations, standards and policies that apply to the Construction Industry and by gaining a greater understanding of how Industry Professionals perceive [notions of] sustainability, it can be better understood how to improve the efficacy of the applicable regulations, standards and policies – while also providing valuable insights into the impact that both formal and work-place education around sustainability has on the knowledge, understanding and practices of a designer.

As has already been hinted to above, this research also presents the opportunity to reflect upon the approaches that have been taken by Government and how serious they are taking the issues of sustainability and the intent with which they are to be meaningfully tackled.

Also of significance, is the juncture that society now finds itself at. National and intranational governments, agencies are declaring a 'climate emergency', but what can they be seen to be doing about it at the local level. The popular adage of 'think globally, act locally' could hardly be more apt. It is only by local action and the compounding effect that it can have across all societies and the planet that the behavioural changes that are required might be achieved.

1.5 Research Scope

This research will be undertaken in as pragmatic a form as is possible, to investigate the sustainability perceptions of architectural designers, currently working in Scotland, designing for residential projects that are under the purview of the Scottish Building Standards. Each of these factors will be explored, along with the accompanying explanation and rationale in Chapter 2: Context and Review of the Literature.

1.6 Research Identified with Similar Scope

The following provides some details about research with a similar scope that have been identified and are worth noting:

- Murtagh *et al.* (2017): Building control officers / surveyors and their role in promoting sustainable construction.

- Giesekam *et al.* (2015): Construction sector views on low carbon materials.

- Gibbs and O'Neill (2015): Sustainability transitions int eh UK building sector.

- Studies by Imrie and Street (2007, 2009, 2011): Several pieces of research – together and individually - Looking at the relationships between architects and building regulations.

- Grover *et al.* (2019): Sustainable development and architectural practices.

- Heffernan *et al.* (2015): Perceptions around zero carbon homebuilding from construction industry professionals.

- There are also several other works have been done considering views, perceptions, motivations and opinions in relatively closely related areas, such as Moran & Rau (2016), Carter & Fortune (2007) and Altschuler and Brownlee (2016).

1.7 Developing Aims and Objectives

There are several aims and objectives that are anticipated for this research project and they will be clearly laid out at the end of Chapter 2. Broadly, however, they can be captured as an attempt to see sustainability in the built environment through the eyes of a designer. This is not an attempt to create some sort of archetypal, average or typical 'designer' in some way, but to analyse the various perceptions that *may* exist across a range of different designers and from that present the various situations and contexts that may exist or be encountered across the profession. This is with a view to understand them better and, consequently, present ways by which their situation might be improved. In terms of how this is achieved, for Brinkmann and Kvale (2015) it is described as a better understanding of the 'themes of the lived daily world from the subjects' own perspective' while for Fellows and Liu (2008) it is a way to 'research other persons' worlds' and this is primarily achieved by interviewing designers.

To achieve this, a range of different aspects will be investigated. This will include an exploration of the professional situations that designers find themselves in, the influence they may or may not be able to exert, the level to which there are external or constraining factors to their work and how they see the role of a designer both in the industry and in society. In doing so, there will be a necessary exploration of the definitions under which designers work as they approach sustainability, the educational frameworks that exist for designers, the modes of Continuing Professional Development that prevail for designers, the different ways in which different Professionals and Trades interact with each other in a project and also the Scottish Building Standards and other guiding materials and principles that may be followed or adhered to.

1.8 Research Approach

There will be a considerable exploration of the philosophical and methodological approaches adopted in this research in Chapter 3: *Methods and Methodology*. However, it is important to note at this point that this research project will utilise a qualitative mode of research and the need for this type of research has been mentioned in the preceding sections. Broadly, both ontologically and epistemologically – to different degrees – there will be the adoption of an Interpretivist (or anti-positivist) research

philosophy, as it is more appropriate than a positivist philosophy, which would also be more closely aligned with quantitative approaches. The nuances of the philosophical assumptions that have been adopted will be considered in detail in Chapter 3, but it is worth noting that an interpretive view specifically integrates human interest into the study and allows for the researcher to interact with the research subject. Further to this, as Schweber (2012) points out, interpretative research can be used to explore how this human interest is expressed in the meaning it carries as it: "assumes that human behaviour is mediated by meaning and seeks to identify types of processes and their expression in particular contexts."

As will also be shown in Chapter 3, the mode of primary research being employed in this study is that of semi-structured interviews. This allows for the more natural exploration of a broader range of subjects with the interviewee, while also helping to prevent the possible curtailing of discussion and reducing the risk of missing pertinent information that a more structured approach may cause. This is supported by the assertions of several authors including Brinkman and Kvale (2015), Wooffitt and Widdicombe (2006) and others and will be more fully outlined in later chapters.
It should also be noted that after the interviews were completed and while data analysis was taking place, a detailed discussion was held with John Brennan, Senior Lecturer in the Edinburgh School of Architecture and Landscape Architecture. Some of the talking points from the interviews were discussed with him and these will be referred to in both the discussion and concluding portions of the thesis.

1.9 Research Contribution

This research will make a valuable contribution to several beneficiaries directly related to the Construction Industry and the Architecture Profession. It will be of considerable interest to Architects, Designers and Industry Professionals, for whom it will help provide a greater understanding of how fellow professionals approach and understand the context of their work. This research will also be of value to Policy Makers for the further development of robust sustainability and Industry-related Policy and Regulation. For Educators and those who develop and deliver Continuous Professional Development syllabi and guidance, too, this research will provide a significant contribution. The research outcomes will aid the further development and integration

of an effective understanding of the various facets of sustainability and sustainable development - as it relates to the Construction Industry - into the educational frameworks that drive the foundational training and ongoing development of designers.

1.10 Thesis Structure

Chapter 2, *Context and a Review of the Literature*, considers the history and emergence of the sustainability discourse for the build environment and associated understandings and definitions of sustainability that are most relevant to this research. This is done in conjunction with an interspersed review of the relevant literature and there is also come consideration of the specific geographic and participant context for the research

Chapter 3, *Methods and Methodology,* explores the rationale and appropriateness for a qualitative research approach for this research and the philosophical assumptions that will be adopted. There is also consideration of the different types of method that are available and best suited to this research.

Chapter 4, *Data Collection,* the means of collecting the data for this research – the semi-structured interview – is discussed and the various method-specific protocols that should be followed to achieve successful outcomes.

Chapter 5, *Data Analysis,* outlines the stages of the adopted method of analysis for this research – Thematic Analysis – and introduces the initial thematic coding of the data that will be used to identify themes.

Chapter 6, *Discussion,* builds upon the codes presented in Chapter 5 and discusses the different Themes that are developed, followed by a consideration of some emerging *indicator* themes.

Chapter 7, *Conclusions and Recommendations,* completes the Thematic Analysis process this has been followed and presents conclusions, recommendations and suggestions for further work based on this research.

CHAPTER TWO

CONTEXT AND REVIEW OF THE LITERATURE

'For the architect, sustainability is a complex concept'

Brian Edwards - Rough Guide to Sustainability (2014)

2.1 Introduction

This chapter sets out the context for this research and, in doing so, looks at a number of interconnected and associated areas that will benefit from further exploration to help provide a greater understanding of some of the factors that are particularly relevant to sustainability and the built environment. This chapter will draw upon different parts of the literature to form an overview of the research landscape that this research is situated in, as well as providing insights into some aspects that necessarily arise when researching sustainability in the build environment. It is only by situating this research in a broader, partially historical context – as the first section shows – that the sustainability discourse around the built environment can be better understood, and thereby a fuller appreciation gained for the underlying rationale for this research.

First, this chapter will look at the emergence of the sustainability 'agenda' i.e. the key events and advancements in knowledge that have resulted in the numerous ecological, climate, sustainability and development concerns coming to the forefront of the international and inter-governmental *agenda*. Then, the focus will turn to look at how the international community has sought to address these concerns and the national and international, targets and commitments that have sought to secure transnational action. Following this, the built environment will be specifically considered, and how the use of assessment methods, legislation and regulation have been used to different degrees as the construction industry seeks to lessen its ecological impact and promote sustainable practices. In the penultimate portion of this chapter the specific context of this research will be laid out, looking briefly at the boundaries that have been set for this project, as research that seeks to investigate the perceptions of sustainability that are held by architectural designers in Scotland.

Finally, in this chapter, considering the introduction that has already been provided and the context that will be laid out here, the Aims and Objectives will be set out.

2.2 Sustainability

While the views of different commentators will emerge in this chapter as to what they think sustainability is, or what might be inferred as being a suitable 'definition', it is not the intention of this research to provide a succinct definition of sustainability, or even attempt to derive a 'best-fit' or working definition. Instead, by looking at some of the background to how the sustainability 'discourse' has emerged, it is intended to present some key, different, ways in which sustainability is *understood* or *conceived* that are relevant to this research. As the following sections will demonstrate, sustainability and, by association, sustainable development are complex terms and have emerged due to specific, historical reasons.

2.3 Sustainability – A Potted History

Until the second half of the 20th century, and particularly when compared to today, little was appreciated, nor understood about the relationship between humankind and Planet Earth, in terms of the differing and wide-ranging impact that humans have on the planet and how dependant humanity is upon the earth to provide all the physical resources needed to survive and for society to develop. Of course, human society has been, at different times throughout history, acutely aware of the physical limits imposed by food shortages caused by drought and famines at different times, and it these times of crisis that have precipitated notions of, and focused minds towards sustainability as we now conceive of it.

The context for this research, then, must begin with the environment, and in terms of appreciating the calculable physical limits facing humanity, some might consider Hans Carl von Carlowitz (1645 -1714) to be the first to postulate this, when he introduced the idea of *Nachhaltigkeit* (which translates as 'sustainability' in German) in 1713 (Warde *et al.*, 2018) when faced with timber shortages in Saxony owing to the substantial reliance on wood for burning to be able to extract mineral ores from mines. It was Thomas Malthus (1766 – 1834) who was possibly the first to explore in earnest, the effect that burgeoning human populations might have with his (at the time) controversial essay, *An Essay on the Principle of Population* first published in 1798 (ibid). This work explored the relationship between population growth and food production, arguing that population tended to grow geometrically while food

production tended to grow arithmetically which leads to cycles of famine, food shortages and poverty. It is probably fair to say, though, that food shortages, fuel/energy shortages and the effects of extreme weather throughout the vast majority of human history thus far, would often only have been conceived of as a *local* issue, rather than *global* issue or phenomenon that seem so obvious in today's globalised society – albeit knowledge and understanding that remains elusive, still, to a significant proportion of the world's population. As technology and human mobility improved during the 18th and 19th century and glimpses of modern globalisation began to emerge, it was in the 20th century and, specifically, the latter half of the century that a real understanding of these issues began to emerge.

A variety of events and published works in the latter half of the 20th century led to the raised awareness of a host of environmental issues that have, in turn, contributed to the emergence of discussions surrounding 'sustainability' and 'sustainable development' specifically and, consequently, the various off-shoots and application of these terms that are now commonly used. As will be demonstrated below, the early post-war years up to the 1970s and into the 1980s were largely influenced by what might be called *political environmentalism* as labelled by Warde *et al.* (2018) That is, political mobilisation towards (almost entirely) environmental problems – and often around a single issue, or closely related issues rather than a systemic, global set of interrelated and co-dependant relationships – although this did come to the fore as the debates and conversations stemming from this early political environmentalism developed, and scientific evidence began to mount for a number of emerging issues.

There are a host of sources and published works over the last century or more that have contributed to the development of this picture that humanity can now more accurately place itself in. Many works have provided a springboard to further work and development of knowledge and, in particular, the ever developing narrative that places humanity as the causal factor in many of the global, environmental issues that face humanity and Planet Earth. Of course, not only is humanity at the point where these *anthropogenic* and *anthropocentric* issues themselves are contested; the route to 'fixing' these issues – whether that be via mitigation, adaptation, amelioration or something else – and even the necessity of them are also contested. Further to this, and most

pertinent to this research, it will also be shown that the understanding and applied definitions surrounding what might be described as the 'end state' i.e. 'sustainability' are contested.

2.4 The Emerging Problem(s)

With the publication of Rachel Carson's somewhat seminal work 'Silent Spring' in 1962 (Carson, 1962) came the realisation that agricultural chemical use and synthetic pesticides such as 'DDT' were doing far more than just controlling the unwanted pests that blighted crop farming. This was one of the first books to bring such a topic to the attention of the general public – the United States in this case. Intended to control pests and ostensibly improve crop yield, Carson discovered, and reported on, the devastating effects that pesticide use was having on the surrounding environment where DDT was being dosed, as well as forming part of a broader narrative on the effect that humans have on their environmental surroundings.

In 1968, economist Edward Mishan published 'The Costs of Economic Growth' (Mishan, 1967) and cast doubt on how effective Gross National Product (GNP) was as a measure of human welfare – pointing to the fact, as Dresner (2009) points out, that GNP includes defensive measures such as anti-pollution expenditure but not any negative effects that come with affluence. Following this, in 1968, another author – Garrett Hardin – published an essay entitled 'The Tragedy of the Commons' (Hardin, 1968) which explored the concepts of self-interest, growth and rational behaviour towards access to a shared 'good', citing the hypothetical situation of pastoral farmers sharing a field for their animals. Hardin concludes that the problems of unavoidable overgrazing can only be solved by controlling access and therefore, the 'tragedy' when projecting this problem to a global scale is that of the problems caused when human population growth increases the consumption of natural resources.

Also published in 1968, in 'The Population Bomb' (Ehrlich, 1968) Paul Ehrlich, 'tap', as Warde *et al.* (2018) describe it, 'into the anxieties of the age'. Written at the behest of the environmental campaigners, the 'Sierra Club' (ibid)., However, the alarmist predictions described in 'The Population Bomb' of imminent starvation of millions of people during the 1970 via famine and ecological collapse are, as Dresner (2009) notes,

'regarded with embarrassment by most environmentalists today. Ehrilch's alarmism was, though, influential in raising concern and his work resulted in the development of the impact of human population being expressed in the equation I=PCT [or I=PAT (Huesemann and Huesemann, 2008), (Bjørn, A. & Hauschild, 2013)], which is still an active mode of enquiry today (ibid) due to the way it explores the relationship between environmental impact [**I**], population size [**P**] , per capita consumption [**C**] or affluence [**A**] and the technology factor, or 'impact of productive technology [**T**] (Dresner, 2009).

While ecological collapse did not occur in the way Ehrlich had warned, the 1970s did experience factors such as energy scarcity that had never been encountered before on a global scale, and 1972 saw the publication of *Limits to Growth* (Meadows *et al.* 1972). This report is arguably a 'crystallisation of the concerns of the first wave of environmentalism that ran from 1966 to 1972' (Dresner, 2009) and examined – using computer analysis – the global economic system, highlighting problems that would undoubtedly occur for the global population and economic output should population and demand for non-renewable resources continue to increase as rapidly as they had been, while pointing to the need for a more sustainable approach. The report established the ideas of natural limits and, while not claiming to be a definitive prediction, did demonstrate that some models could show a society capable of maintaining the average European standard of living – but only when projected with both zero population and zero capital growth.

Finally, in this section, it is worth noting the work of Herman Daly's *Steady State Economics* (Herman, 1977) and the impact of the *Global 2000* report (Barney, 1980). Daly, building upon the earlier work of Meadows *et al.* investigated the concept of *the law of entropy* and related this to the irreversibility of using fossil fuels as a source of energy. As Dresner (2009) notes, Daly established the link between economic activity (i.e. energy and material throughput) necessarily creating pollution and wastes while also establishing a further *limit* of critical importance – the physical limit of the biosphere to absorb the pollution and wastes. While the Global 2000 report (Barney, 1980) highlights many important global environmental concerns, it ultimately fell on deaf ears, as Dresner (2009) reports, because the political Administration in the United States changed around the same and the incoming President Regan was not particularly

interested in the findings of the report. More crucially, though, is the parallel feature that Dresner (ibid) highlights in that the environmental leadership subsequently changed in the 1980s from the United States – then more typically concerned with 'wilderness' environmental concerns – to Europe, where the environmental concerns centred around the issues of industrialisation.

2.5 Engaging the International Community

In parallel to what is described in the preceding section, international collective action efforts have emerged, and attempts made by the international community – through organisations such as the United Nations and the European Union – to combat these social and ecological problems since the early 1970s. The following section provides brief overview of some of these efforts and some of the key agreements that have attempted to be reached, many of which have resulted in the signing of international treaties and protocols

In 1972 the UN Conference on Human Environment (UNCHE), in Stockholm, is probably where environmental degradation was widely acknowledged by the international community for the first time. It is in this conference that the notion of 'eco development' was first conceived (Glaeser, 1995) and this forerunner to the term 'sustainable development' recognised that 'the purpose of development is not solely to enhance economic growth: it should preserve and improve the environmental basis for economic development' (ibid) and as Cole (2004) asserts, this was the beginnings of a movement where environmental concerns 'were of sufficient significance to enter the political realm as an explicit and distinct agenda'

With reference to the built environment, the Royal Institute of British Architects (RIBA) annual conference of 1972, entitled *Design for Survival,* is where the 'survivalist mindset' emerges for the first time (Cole, 2004) and as Cole (ibid) reports, several important challenges emerged from different people at the conference, including:

- The role that architects and designers can have in limiting the demands on nature and not squandering limited resources.
- The role architects and designers can have in fostering improved, synergistic working practices rather than the predominant fragmented approach.

- The role that architects and designers can have as stewards and trustees for posterity, bound to pass on the world no worse than it is found.

- The role that architects and designers can have in engaging with policy discussions about the natural environment and the larger social purpose that they serve.

In 1974, however, the World Council of Churches (WCC), inspired by the UNCHE of 1972, were probably the first to develop the notion of 'sustainable society', in the following terms, as Dresner (2009) outlines:

> *First, social stability cannot be obtained without an equitable distribution of what is in robust global society will not be sustainable unless the need for food is at any time well below the global capacity to supply it and unless the emissions of pollutants are well below the capacity of the ecosystems to absorb them. Third, the new social organization will be sustainable only as long as the use of non-renewable resources does not out-run the increase in resources made available through technological innovation. Finally, a sustainable society requires a level of human activities which is not adversely influenced by the never-ending large and frequent natural variations in global climate.*

While the WCC contribution may not be so widely known, and certainly takes a much more 'social' view (Bolis *et al.*, 2014) it arguably both influenced, and paved the way, for many of the debates and discourse that have since followed.

In 1980, the term 'sustainable development' emerges for the first, in the World Conservation Strategy, published by the International Union for Conservation of Nature and Natural Resources (IUCN) (IUCN, 1980). It is here that the term 'sustainable development' is defined as the "*integration of conservation and development to ensure that modifications to the planet do indeed secure the survival and well-being of all people*" (ibid), while development itself is defined as 'the modification of the biosphere and the application of human, financial, living and non-living resources to satisfy human needs and improve the quality of human life' (ibid)

2.5.1 The Brundtland Report

It was not until 1987, however, that sustainable development was 'brought to international attention' (Meadowcroft, 2000), as large parts of the world were gripped by famine and living in poverty, the World Commission on Environment and Development (WCED) Report *Our Common Future*, often referred to as 'The Brundtland Report' was published. The WCED was constituted by the UN in 1983 and chaired by Norwegian medical doctor and physicist Dr Gro Harlem Brundtland[7], who also served three terms as the Norwegian Prime Minister.

The Commission introduced the notions of environmental, social and economic 'capital' (Edwards *et al.*, 2014) and also the following key features, identified by Meadowcroft, 2000):

- A focus on how to sustain a broad process of positive social change called 'development'. Such 'development' was understood as an advance in the material and moral circumstances of humanity – in a word, 'progress';

- The employment of the idea of 'meeting needs' to characterise the just aspirations of all peoples, but most particularly to emphasise the legitimate moral claims of (i) the world's poor and (ii) future generations. This priority on the needs of the poor, and the proviso that the ability of future generations to meet their needs must not be compromised, help define the nature of those authentic forms of 'development' which were to be styled 'sustainable';

- It invoked an idea of environmental limits as a potentially serious obstacle to continued social advance. The authors stressed that the environment's capacity to support human activity was not fixed in any simple way – different limits held for different resources, and improved technologies and social organization could enhance environmental carrying capacity. But they also affirmed that there were 'ultimate limits', and they argued that in some cases these environmental limits had already been breached by human activity.

[7] UN Information webpage on Gro Brundtland available at: https://www.un.org/News/dh/hlpanel/brundtland-bio.htm (accessed 31 July 2019)

Aside from this, of course, is the 'definition' that has made the WECD of 1987 famous, in asserting that sustainable development is:

> *development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization in the environment's ability to meet present and future needs. WCED (1987)*

2.5.2 Beyond Brundtland

There have been many different international conferences, agreements and accords agreed, or attempted in the years following the WECD of 1987, and the following section highlights some of these, including some of the key points.

The UNCED 'Earth Summit' in Rio de Jeneiro in 1992, moved the discourse on from resource concerns to Energy, Environment and Ecology, as commented on by Edwards *et al.* (2014), who also note that it is also in the Rio conference where the 'precautionary principal' was adopted, which states that:

- No environmental action should be taken which was not reversible
- Designers should use the best scientific knowledge available
- Scientists had a duty to develop environmental knowledge
- Ignorance was no defence under international las for ecological damage

(ibid)

Following 'Rio' the tenor of the sustainability discourse began to noticeably change, beginning with the realisation of the problems of 'global warming' and greenhouse gas (GHG) emissions (GHG), terminology which has largely now given way to simply 'climate change'. The 'Kyoto Protocol', signed in 1997, but not binding until 2005, attempted to gain international agreement to reduce GHG emissions and introduced Emissions Trading Schemes, but had limited success, as Edwards (ibid) points out, due to the failure to get USA, Russia and Australia to sign up to it. Edwards, also further points (at the time of their writing) to several other intergovernmental agreements that

attempted to find consensus on climate change and the limiting of CO_2 emissions: Hague (2000), Johannesburg (2006), Bali (2007), Poznan (2008), Copenhagen (2009), Durban (2011) and Doha (2012).

Further to the agreements listed above, there have since been further notable attempts to curb emissions, and now with the stated aim of attempting to prevent the further rising of global temperatures. The most notable of these is probably the 'Paris Agreement'[8] of 2016 which states that, in addition to enhancing resilience, the:

> *central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.*[9]

It can also be noted that. during this time, the Intergovernmental Panel on Climate Change[10] (IPCC) has risen to prominence as the 'guardians' of climate change science and evidence (Edwards *et al.*, 2014), and climate change became a 'mainstream' political issue (Giddens, 2009). Indeed, the IPCC 'Special Report' of 2018 has cause a great deal of controversy and concern by stating that the agreements of the 2016 Paris agreement are not likely to be met without further, substantial emission reductions.[11]

In all of this, 'development' has not fallen off the agenda and, again, there have been several notable international conferences to deal with sustainable development specifically.

The 2002 World Summit on Sustainable Development in Johannesburg is where the concept of 'sustainable consumption and production' was introduced and, further, the establishing of a link between productivity, resource use and levels of pollution. As Edwards (2014) outlines, the key points of the agreement were:

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[8] The United Nations 'Paris Agreement' information website page: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement (accessed 29 July 2019)
[9] As footnote 1
[10] The website of the International Panel on Climate Change: https://www.ipcc.ch/ (accessed 29 July 2019)
[11] The IPCC 'Special Report' (2018) available at https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf (accessed 29 July 2019)

- Ensuring that economic growth does not cause environmental pollution at a global and regional level
- Improving efficiency in resource use
- Examining the whole life cycle of a product
- Giving consumers more information on products and services
- Exploiting taxation and regulation to stimulate innovation in clean technologies

In 2012, 'Rio+20'[12] – The United Nations Conference on Sustainable Development took place in Rio de Janeiro and began to lay much of the ground work in the development of Sustainable Development Goals (SGDs), while the conference also considered green economy policies and the strengthening of the United Nations Environment Programme (UNEP)

Lastly in this section, is a mention of the United Nations Sustainable Development Summit, held in New York in 2015 to commit to a set of sustainable development goals, targeted for achievement by 2030, dubbed *Transforming Our World: the 2030 Agenda for Sustainable Development.*[13] Building on eight 'Millennium Development Goals' adopted in 2010[14], the current sustainable development goals consists of 17 wide-ranging goals and 169 associated targets. While no particular commentary is needed on these goals, it is interesting to note what they are and how they have developed, compared to the 'potted history' that has been charted in the preceding sections.

[12]The United Nations information page on the United Nations Conference on Sustainable Development, 'Rio+20': https://sustainabledevelopment.un.org/rio20 (accessed 30 July 2019)
[13] The information webpage for the United Nations 'Transforming our world: the 2030 Agenda for Sustainable Development': https://sustainabledevelopment.un.org/post2015/transformingourworld (accessed 30 July 2019)
[14] The United Nations webpage for the 'Millennium Goals': https://www.un.org/millenniumgoals/ (accessed 30 July 2019)

The 17 Sustainable Development Goals for 2030 are[15]:

Goal 1. End poverty in all its forms everywhere

Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Goal 3. Ensure healthy lives and promote well-being for all at all ages

Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Goal 5. Achieve gender equality and empower all women and girls

Goal 6. Ensure availability and sustainable management of water and sanitation for all

Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all

Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Goal 10. Reduce inequality within and among countries

Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable

Goal 12. Ensure sustainable consumption and production patterns

Goal 13. Take urgent action to combat climate change and its impacts*

Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development

[15] As footnote 6

While, clearly, not all these sustainable development goals will have *direct* actions or implications for the construction industry or built environment, it will be useful to be aware of the goals and those that are applicable to the built environment – even tangentially. This will be particularly useful as the discussion in the remainder of this chapter begins to focus on the more specific context of this research and, hence, aspects pertaining to the built environment, construction industry and architectural designers.

In all of this it is important to note that the UK, as a member of the United Nations and signatory to the 2030 Sustainable Development Goals, is obliged to contribute to the delivery of these goals, and the UK Department for International Development has stated that 'The most effective way to do this is by ensuring that the Goals are fully embedded in the planned activity of each Government department',[16] which it has committed to implement. As for targets aimed at the reduction of emissions related to climate changes, however, the UK, as a member of the EU is bound to contribute to the EU targets, and the proportions thereof, that have been allocated to the UK. The following section outlines these overall targets and the subordinate ones that have been committed to by the UK.

2.5.3 Responses to Climate Change

The EU has three categories of targets that it has committed to achieve by 2050[17]:

a) By 2020:

- 20% cut in greenhouse gas emissions compared with 1990
- 20% of total energy consumption from renewable energy
- 20% increase in energy efficiency

b) By 2050:

- At least 40% cut in greenhouse gas emissions compared with 1990
- At least 32% of total energy consumption from renewable energy
- At least 32.5% increase in energy efficiency

c) Long-term Goal:

- By 2050, the EU aims to cut its emissions substantially – by 80-95% compared to 1990 levels as part of the efforts required by developed countries as a group.

[16] From the Department for International Development Implementation report: https://www.gov.uk/government/publications/implementing-the-sustainable-development-goals/implementing-the-sustainable-development-goals (accessed 29 July 2019)
[17] EU Climate Action targets: https://ec.europa.eu/clima/citizens/eu_en (accessed 29 July 2019)

As a response to this, and earlier challenges and targets set by the EU, the UK was the first country to enact a long-term legally binding framework to cut carbon emissions[18] with the target of reducing emissions by 100%[19] by 2050, compared to 1990 levels i.e. 'net zero' via the UK Climate Change Act of 2008 (UK Parliament, 2008), having increased this figure in 2019 from the original commitment of 80% when the Act came into force.[20]

The UK construction industry's contribution to these reduction targets, and those enacted by Scotland in particular, will be discussed further below, after considering some further specific features of the sustainability 'discourse' that will help to further appreciate the context of this research.

2.6 Features of the Sustainability Discourse

2.6.1 Sustainability and Sustainable Development – Contested Notions

While the discussion above has largely been historical and has 'steered clear' of many of the associated *philosophical* and *definitional* issues that are invariable entangled in any discussion on sustainability, they cannot be completely ignored. In order to appreciate the context of research such as this, cognisance must be made of the problems that do permeate the sustainability discourse and how differently people might *understand* or *conceive* of different concepts.

Since their emergence, the concepts of sustainability and sustainable development have suffered from both contention and scepticism. Indeed, the seeming interchangeable-ness of the terms almost nullifies any attempt to favour the use of one term over the other, depending on the context and intentions of the user. In addition to this, c*laims* of 'sustainability' are now ingrained and permeate most aspects of everyday life, where such overuse has largely resulted in the dilution and loss of meaning (O'Riordan, 1998) for such claims, in many cases.

[18]The Committee on Climate Change webpage 'Tackling Climate Change': https://www.theccc.org.uk/tackling-climate-change/ (accessed 29 July 2019)
[19] This includes reducing emissions from the devolved administrations (Scotland, Wales and Northern Ireland), which currently account for about 20% of the UK's emissions.
[20] The Committee on Climate Change information page on the Climate Change Act: https://www.theccc.org.uk/tackling-climate-change/the-legal-landscape/the-climate-change-act/ (accessed 29 July 2019)

'Sustainability', 'sustainable development' and their closely related concepts are, thus, undeniably both contested and contestable owing to their disparity and research or disciplinary context as highlighted by Bolis, *et al.* (2014) and this is a point that has received some attention by several writers, including Michael Jacobs (1991), Tovey (2009), Moran and Rau (2016), Rau and Fahy (2013) and Steve Connelly (2007) who deals with it in substantial detail. From an engineering perspective, Carew and Mitchel (2008), too, point out that there is no 'uniform agreement about what sustainability is and what its implementation in engineering professional practice [entails]' meanwhile Murtagh *et al.* (2016) in their research with architectural designers describe sustainability as 'ill-defined' and Meadowcroft (20007) remarks that:

> *Sustainable development is a complex and contested concept, and despite the pages of 'consensus documents' adopted by international agencies and conferences, there remain many different perspectives on what it entails and the scale of reforms required to give it force*

Further to this, Marshall and Toffel (2005) refer to a 'definitional chaos' that has served to effectively render the term 'sustainability' meaningless, a theme that is also picked up by Kirkby *et al.*, (1995) and Lindsey (2011). Although, it should be noted that some, including Carew and Michel (2008), also citing the work of Crofton (1995, 2000) do consider the somewhat dynamic nature of defining sustainability to be a positive hallmark, as it would be counterproductive to the implementation of sustainability to attempt to ''normalise' closely define or freeze sustainability into a constant, inflexible, singular or generic concept…' As a final note here, it is interesting that O'Riordan (1998) sees the dichotomy as 'sustainable development' being a term that ultimately gives priority to *development*, while sustainability is primarily about the *environment*.

In consideration of the substantial, varied and highly complex nature body of literature it is felt that it would be unhelpful, in the context of this research, to undertake a far ranging, and almost certainly unwieldy, review of these definitional permutations, beyond what has been provided here thus far and what will follow. Of course, some additional definitional clarity and context does need to be provided, and that will be considered in the following sections.

In Wu (2013) five 'fundamental concepts of sustainability' are presented – three of which are identified as being most relevant to the context of this research and their principle features will be outlined below.

First, is the 'Brundtland Definition', which for the purposes here, will be the basis of some consideration of the term 'Sustainable Development', further to the introduction to the term that has been given above. Second, is the 'triple bottom line' (TBL) – sometimes referred to as 'People, Planet, Profit' and encompasses the dimensions of economy, environment and society. Third, is 'Weak (or 'soft') Sustainability and 'Strong (or 'hard) Sustainability'.

2.6.2 Sustainable Development

As has mentioned above, and, dealing with the term 'sustainable development' specifically, the 'Brundtland definition' or understanding of sustainable development, found in the WCED[21] Report in 1987, remains one of the most cited definitions. It is often shorted to being 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (WCED, 1987).

While the WCED report did not coin the term 'sustainable development', it certainly made the term famous (Warde *et al.*, 2018) and 'it provided the term with a plausible content and a heady dose of legitimacy.' (Meadowcroft, 2000)

For Wu (2013) the popularity of the definition is attributed to two primary factors:

1. It captures the essential elements of sustainability such as a balance between society, nature and the equity between generations, albeit in a 'rather general and vague fashion' and
2. The 'general and vague' factor has actually helped with its adoption across several fields, domains and purposes as it 'allows for the various, and sometimes incompatible, interpretations'.

[21] The UN World Commission on Environment and Development

Further criticisms include the fact that it does not help determine what are meant by 'needs' (Brandon and Lombardi, 2011) and that it is 'non-operationalizable' i.e. it is not possible to deduce a definitive course of action (Dresner, 2009). Meanwhile, for Robinson (2004) the term is a 'contradiction in terms', between opposing imperatives i.e. growth and development vs ecological (and social and economic) sustainability which leads Robinson, to describe the term as being an equivalent to the impossibility of 'squaring a circle'.

Further to this, Roberts (2004) raises several issues relating to the notion of sustainable development that it is important to be aware of:

- The concept of sustainable development is somewhat *loaded* because, by definition, there are only two alternative views – unsustainable development or no development at all.

- The definition offered by the Brundtland Report is fundamentally based on equity i.e. fairness of distribution rather than equality which would mean everybody would get the same, although there it is also made clear in the Brundtland definition that lifestyles will have to adjust.

- The concept arises from a *technocentric* worldview, where people are more important than nature. The needs of humanity are central, and this vision does not allow for the 'standstill' economic option offered in *Limits to Growth* (Meadows *et al.*, 1972)

- There is a recognition that it is only via politics and policy that sustainable development can be achieved – which will require changes to political systems and inter-governmental relations for decision making.

- By leaving itself open to too many interpretations, the Brundtland definition raises questions about wealth, quality of life and material 'needs' – not just now but for future generations too.

Finally, in this section, are some observations by Simon Dresner (2009), who notes the following about the term 'sustainable development':

- The starting point was to integrate environmental considerations into environmental policy and, crucially, an 'attempt to bring environmentalist ideas into the central area of policy'

- Disagreement over the definition of 'sustainable development' does not mean that there is no meaning at all, and it has still served well to bring forward the debate, even despite this.

- Close associations with the 'growth agenda' have resulted in radical environmentalists being 'deeply suspicious of it'

- 'Sustainable development' has begun to give way to 'sustainability' - an opportunist move by environmentalists as the 'euphemism for growth for its own sake has become widely known' It is also observed that even politicians have been affected by this and increasingly are using 'sustainability' in favour over 'sustainable development'

- Lastly, Dresner (ibid) also notes that *'It might not be too cynical to draw the conclusion that people are all in favour of sustainability only so long as it does not involve any personal inconvenience.*

Despite, all this, the term and 'definition' persists, and is the foundation on which much policy, legislation and regulation continues to be based on, as will be shown in later sections of this chapter, when the Scottish Building Standards are considered. The likely cause of this is unclear, but it is likely that a combination of convenience, expedience and elements of status quo are some of the reasons behind it.

2.6.3 The Triple Bottom Line

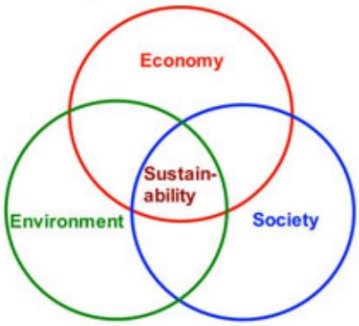

Figure 2.1 The Triple Bottom Line (Wu, 2013)

Inspired by the Brundtland Report, and associated understandings, as discussed above, the Triple Bottom Line (TBL) approach (figure 2.1) was conceived by John Elkington in 1994 as a way of emphasising the importance of the importance of *social* and *environmental* consequences in *economic activities* (Elkington 2004). Giesekam *et al.* (2015) considers this conceptualising of sustainability as a 'broad' definition and, as Wu (2013) notes, the rising popularity of sustainability in the Corporate world has led to TBL being widely adopted as the conceptual 'standard'. What remains to be a 'grand challenge', for the TBL is an understanding of how the three factors relate to each other and how this might change at local, regional and global scales and, further to this, determining what the thresholds or tipping points are in substitution between the three factors or 'types of capital' (ibid). In Carew and Mitchell (2008) it is highlighted that the subdivision of sustainability into three separate, subordinates concepts is a useful way to render this understanding 'more accessible' than other models, although conversely, a flaw in the model is notable in that there is nothing to determine what the balance should be between the three factors and, indeed, whether they should be equal or, whether there should be an attempt for them to be treated as factors in *equal* balance. As such, Moir and Carter (2012) note that in practice, 'there is a tendency among some proponents of sustainability to prioritise the environmental dimension above the other aspects'

2.6.4 Weak and Strong Sustainability

The notion of sustainability being conceived as existing in 'weak' and strong' forms or, indeed, there being a 'spectrum of views in between them' (Brandon and Lombardi,

2011), also fits in with what Boschmann and Gabriel (2013) and Lavelle *et al.* (2015) describes as different 'shades of green' and what Giesekam *et al.* (2015) refer to as 'broad' and 'narrow' definitions. In a similar vein for Pelenc and Ballet (2015) it comes down to two fundamentally different views of 'natural capital' and, as Dresner (2009) helps clarify, the difficulty lies in 'whether to consider human-made capital and natural capital together (weak sustainability) or separately (strong sustainability). Further to this, Dresner (ibid) says:

> *The question turns largely on the issue of the extent to which technology can compensate for the loss of natural resources. Weak sustainability assumes almost infinite substitutability by technology, an assumption which environmentalists regard with scepticism. Strong sustainability also assumes some substitutability, however. The difficulty is that any assumption about substitutability is ultimately rather arbitrary (Dresner, 2009)*

Weak Sustainability

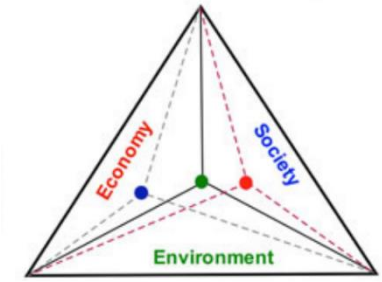

Figure 2.2 Weak Sustainability (Wu, 2013)

The weak sustainability view (figure 2.2) considers natural capital (such as ecosystems or mineral wealth) to be substituted for human-made or manufactured capital (such as factories and urban infrastructure) and this is held to be true to the point where sustainability may still be claimed so longs as the *total* capital increases or remains the same. An example provided by Wu (2013) is that under the 'weak' sustainability view, a region with rapid economic development and urban sprawl at the expense its environmental quality may still be considered as sustainable.

Strong Sustainability

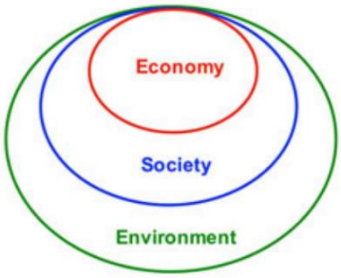

Figure 2.3 Strong Sustainability (Wu, 2013)

Not surprisingly, the 'strong' understanding of sustainability does not permit the allowances of the 'weak' model and Pelenc and Ballet (2015) offer four useful distinctions that help explain why proponents of strong sustanability can not adhere to the weak understanding:

1. Natural capital is characterised by the phenomenon of *irreversibility*, such as an extinction event, and the, which holds that thre are tipping pints beyond which natural capital is unable to recover and, since there is a qualitative difference between natural and manufactured capital or 'technology', manufactured capital cannot adequately replace the natural form.

2. Natural capital can be simultaneously *multifunctional.* An example of this would a rivier where it can provide biological services as habitat for fish, economic services since the fish can be caught and sold or the river could be used for hydroelectric purposes and third, the river can provide recreataional facilities for bathing.

3. Due to a lack of knowledge and understanding about natural systems, it can not be known how damaging the depletion of natural capital might be but it is unlikely manufactured capital can serve as an adequate replacement.

4. Put simply, 'an increase in future consumption is not an appropriate substitute for the loss of natural capital.'

As has been show here, there are clearly many different, and competing *understandings*, *definitions* and *visions* of what sustainability is and means. This is unlikey to change and there will be many underlying reasons beyond what has been identified here. Yet, the

following 'diagnosis' – which can equally be applied to 'sustainability' more broadly – offers a compelling identification of what is probably the root causes, where Hopwood *et al.* (2005) describes the situation as follows:

> *There is no such thing as a single unified philosophy of sustainable development; there is no sustainable development 'ism'. In most cases people bring to the debates on sustainable development already existing political and philosophical outlooks.*

2.6.5 Contemporary and Progressive Visions of Sustainability?

Beyond the 'visions' of sustainability that have been briefly outlined above, there are – of course - many other versions and visions that exist, and there are far too many to explore fully here. One contemporary or 'progressive' vision of sustainability that is worth mentioning briefly is that of 'One Planet Living'. While closely associated to the ideals of 'Strong Sustainability' in many ways - particularly with respect to an understanding of operating within absolute (resource) limits -the notion of society operating within a much curtailed 'ecological footprint' is not new (Moore and Rees, 2013) it has been developed and popularised by the Bioregional organisation in collaboration, originally, with the WWF[22] As a set of principles, intended to change cultures rather than an accreditation system, the One Planet Living Framework asserts that transformational change is required rather than incremental improvements (Bioregional, 2018) and state that their vision:

> *…is of thriving regional economies where we meet more of our needs from local, renewable and waste resources, enabling people to live happy, healthy lives within the natural limits of the planet, leaving space for wildlife and wilderness.* (ibid)

The Framework is based around 10 'One Planet Living Principles', intended to map directly with the UN Sustainable Development Goals discussed above are outlined as follows (ibid):

[22] For further details, see https://www.bioregional.com/one-planet-living (Last accessed 12th January 2020)

- **Health and happiness:** Encouraging active, social, meaningful lives to promote good health and wellbeing
- **Equality and local economy:** Creating safe, equitable places to live and work which support local prosperity and international fair trade
- **Culture and community:** Nurturing local identity and heritage, empowering communities and promoting a culture of sustainable living
- **Land and nature:** Protecting and restoring land for the people of benefit and wildlife
- **Sustainable water:** Using water efficiently, protecting local water and reducing flooding and drought
- **Local and sustainable food:** Promoting sustainable humane farming and healthy diets high in local, seasonal organic food and vegetable protein
- **Travel and transport:** Reducing the need to travel, encouraging walking, cycling and low carbon transport
- **Materials and products:** Using materials from sustainable sources and promoting products which help people reduce consumption
- **Zero waste:** Reducing consumption, re-using and recycling to achieve zero waste and zero pollution
- **Zero carbon Energy:** Making buildings and manufacturing energy efficient and supplying all energy with renewables

As has been alluded to above, these types of frameworks represent visions of sustainability that are intended to bring about wholistic and *transformational* change across a range of features across society, as echoed by the declaration by the UN in 2015 that 'We are determined to take the bold and transformative steps which are urgently needed to shift the world onto a sustainable and resilient path.'[23] Such transformational discourses propose, and represent, an entirely different vision for the path that society to take as it continues to develop toward a 'more sustainable' future. What is clear when considering these transformational proposals is that the fact that they are being proposed can serve to highlight how distant governments, institutions

[23] The United Nations 'Transforming Our World: The 2030 Agenda for Sustainable Development' document available at https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf (accessed 10 January 2020)

and society can find themselves from what is being proposed. What is not clear is how far these groups are prepared to move or adjust their governance, behaviour or patterns of consumption to deliver the transformational ideals.

A further 'transformational' approach might be viewed as a vision of sustainability that is rooted in a circular method of production and the circular economy, whereby the products and services that exist in a transformed culture or society are produced in such a way that the output or 'waste' of production can seamlessly become an input to the same production cycle or, indeed, a different production cycle that will feed from it harmoniously and symbiotically.

In the section that follows there will be some consideration of some aspects of the 'circular economy', beginning with a consideration of the place that is often given to technology in delivering such visions of sustainability.

2.7 A Brief Side Note – Is Technology the 'Hero'?

As an extension to the differences identified above but also, admittedly, a slight tangent to these 'visions' of sustainability, is the role of *technology.* Janda and Topouzi (2015) tell of the 'hero story' which they describe as an inspiring, positive and familiar story where 'society is 'saved' by clever technology' and in some ways, it seems that different visions of 'sustainability' are told in a similar way. This has caught the imagination of Charles C. Mann (Mann, 2018) in his book entiteld 'The Wizard and the Prophet', in which he tells the story of two different scientists in the 20th century, and their visions of differents aspects of what we would now consider parts of the 'sustainability discourse'. Mann casts William Vogt as the archetypal 'prophet'. Although not mentioned among the writers in the earlier part of this chapter, Mann considers Vogt to have laid much of the foundation work in the early environmental movement. In many ways, Vogts views can be conceived as early embodiements of aspects 'strong sustainability, the precautionary principle and a very conservative vision of 'eco-efficiency' all at once. Menawhile, Mann describes the alternative archetypal figure of a 'wizard' – Norman Borlaug – the technological optimist and an important player in the establishment of the 'green revolution' to enhance crop yields in the 20th century. While Mann does pit these figures 'against' each other, the powerful story behind this is

the tendancy for humans, largely, to fall in line behind one or other of these archetypal figures and their 'worldview'.

Beyond this particular dichotomy, there is a futher, additional aspect, that has been added to by the alternative views proposed by McDonough and Braungart – proponents of an enhanced vision of the 'circular economy' that they call 'cradle to cradle'[24] that is explained in their books such as 'Cradle to Cradle' (McDonough and Braungart, 2009) and 'The Upcycle'. (McDonough and Braungart, 2013). They place their work up in direct contract to the 'eco-efficiency', or 'natural capitalism' (Lovins *et al.* 1999), outworking of sustainability which seeks to 'add maximum value with minimum resource use and minimum pollution' (Huesemann, 2004) and with continual improvements, has been proposed as 'the primary guarantor of sustainability' (ibid)

However, as is further pointed out by Hueusemann (ibid) eco-efficiency alone cannot bring about sustainability [in Western industrialised societies] but can only be achieved along with changes to 'life-style, social structure and values' while Bjørn and Hauschild (2013) note that:

> *The eco-efficiency concept involves no long term vision or strategy, the links between resources consumption and waste emissions are not well related to the sustainability state, and increases in eco-efficiency may lead to increases in consumption and hence overall impact*

And Shove (2018), too, notes about 'efficiencies' generally, that:

> *…the problem with efficiency is that it maintains the status quo, and in so doing helps perpetuate unsustainable ways of life. On the other hand, it cannot do so for long.*

The Cradle to Cradle 'vision' of a sustainability, on the other hand – and in direct contrast to both 'eco-efficiency' and the 'strong' sustainability views seeks to indroduce an *eco-effective* approach (McDonough and Braungart, 2009). Similar, in some ways, to alternative visions of 'the circular (or 'looped') enconomy' described by (van Dijk *et al.*,

[24] This can be viewed as an extension of the term 'cradle to grave' the 'traditional', linear view of the lifecycle of an object i.e. material extraction → processing → manufacture → use → disposal. Further information and signposting can be found here: Designing Building Wiki https://www.designingbuildings.co.uk/wiki/Cradle-to-grave (accessed 30 July 2019)

2013) or 'regenerative sustainability' described by Robinson and Cole (2015). The Cradle to Cradle vision is, broadly, a disputing of the eco-efficiency notion of curtailing consumption and its associated mantra of 'less bad is good' as proposed by McDonough and Braungart (2013) and who further suggest that it might be better named 'eco-insufficiency'. Instead, the Cradle to Cradle concept seeks to increase the positive footprint of an activity (rather thatn reduce the negative) with the use of what they term'technical nutrients' (Bjørn and Hauschild, 2013) with a route to sustainability that also incorporates the following three key tenets:

- Waste equals food – everything is a nutrient for something else
- Use current solar income – energy that can be renewed as it is used
- Celebrate diversity – species, cultural and innovation diversity

While this notion of 'technical nutrients' is potentially a challenge to the argument for 'strong' sustainability seen above, the Cradle to Cradle vision of attaining sustainability does assent to the notion of technology as the 'hero' and the dangers that that may pose if technology proves unable to deliver.

2.8 Sustainability and the Built Environment

In a similar way to the difficulties that surround the definitions of 'sustainability' and 'sustainable development', the same problems, to some extent, may be said to persist for what this *means* for the built environment and what constitutes, or is the definition of, a 'green building', for example. This is something that is explored by Berardi (2013) who concludes that, despite the certainty, the social and economic context of a building need to be given greater importance, in a sector where it is the notion of *environmental* sustainability that still predominates in discussion around sustainability.

As has already been mentioned above, in addition to the Kyoto commitment to an 80% reduction in greenhouse gas emissions by 2050, the targets for the UK related to climate change have been laid down by the European Union, For the construction industry, specifically, this is largely via in the European Union 'Energy performance of

Buildings Directive'[25] (EPBD) as a response to the fact that buildings are responsible for approximately 40% of energy consumption and 36% of CO_2 emissions in the EU[26] and which has set out the target of all new buildings being 'nearly zero energy' by 2020[27]. In the UK, the housing sector accounts for approximately 27% of total carbon emissions (Osmani and Davies, 2013), while isolating *energy* use in homes, reveals an 20% of greenhouse gas emissions[28] – and this figure must be reduced by least a 24% by 2030 (Committee on Climate Change, 2019). Further to this, and although not a figure equating to, total and direct emissions it is estimated that the construction industry is in a position to *influence* in excess of 40% of UK emissions (Department for Business Innovation and Skills, 2010).

Although not being directly considered in this research, there is a significant, additional, challenge facing the construction industry in the UK – represented by the number of houses that will still be in use in 2050 *that have already been built,* and which will negatively impact attempts to reduce the impact that housing has on national emissions. It is estimated this 'standing stock' could represent as much as 80% of the housing in 2050 (Shrubsole *et al.*, 2014) which will unavoidably require 'significant energy retrofit of existing homes' (Gupta *et al.*, 2015). This will amount to 'major refurbishment to close to zero carbon levels of ~25 million homes by 2050' (Davies and Oreszczyn, 2012) if the UK is to meet the targets it has committed to, although, the UK is not currently on track to achieve these targets without further major decarbonising of housing, as the 2019 'UK housing: Fit for future?' report by the UK Committee on Climate Change has, brought to attention (Committee on Climate Change, 2019).

Also of interest here may be some further context around the delivery of new housing in the UK. While statistics are gathered separately in Scotland and England, for example, the following is interesting to note – although not attempting to be a comparative account in any way.

[25] The European Commission webpage on the Energy Performance of Buildings Directive: https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-performance-of-buildings (accessed 30 July 2019)
[26] As footnote 16
[27] As footnote 16
[28] Including electricity production

In England, in 2017-18, 222,000 new homes were delivered (NAO, 2019) and the average number of new homes each year between 2005-06 and 2017-18 was 177,000 per year – yet it is interesting to note that this figure has not exceeded 224,000 in any of those years (ibid). The trend of new house building has been of increasing supply, however, a near 7-% increase in output compared to 2005-06 figures will need to be overseen to reach the types of numbers that have been proposed to be delivered by the mid 2020s (ibid). Meanwhile, in Scotland, 22, 273 new homes were delivered in 2018-19, with an increased figure for the sixth consecutive year, and representing a 15% increase over 2017-18[29].

While numbers and the overall trend are certainly increasing, it seems there may still be a long way to go if targets and the perceived need are to be met. In the UK, the vast majority of new housing is delivered by the private sector and much of this is 'volume' house building. While some Local Authorities are building new homes, outside the private sector it is Housing Associations, sometimes in partnership with the Local Authority that is delivering much of the remainder. In England, in 2018-19 approximately 138,000 private enterprise new builds were completed compared to the approximately 28,000 Housing Association homes and 2500 Local Authority[30] homes that were completed[31]. In Scotland, the figures for 2018 were 15, 097 private sector completions, 1280 Local Authority completions and 3823 Housing Association completions[32]

[29] These figures are from the Scottish Government Statistical Releases and are available from https://www.gov.scot/publications/?topics=Housing&publicationTypes=statistics&page=1 (accessed 10 January 2020)
[30] By comparison, in the 1970s this figure was in excess of 100,000 per year. See https://www.local.gov.uk/topics/housing-and-planning/house-building-england for more details (Last Accessed 10 January 2020)
[31]For full figures, see: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/835887/House_Building_Release_June_2019.pdf (Last Accessed 10 January 2020)
[32] For full figures and background information, see: https://www2.gov.scot/Topics/Statistics/Browse/Housing-Regeneration/HSfS/NewBuild (last accessed 10 January 2020)

2.8.1 Addressing the Problems? SAMs, Tools and Procedures

Despite all the target setting, committees and conventions since the WECD in 1987) there is 'still little consensus on an optimal course of action' as noted by Grover *et al.*, (2018) who further highlights that:

> *This heterogeneity is captured within the field of architecture in which diverse issues such as human health, carbon emissions, and biodiversity are all emblematic themes…however, there is no coherent framework with which to critically assess competing approaches.*

While this is almost certainly true, as has already been suggested in this chapter, there has been one aspect of the construction industry's response to climate change that has radically expanded, even in the absence of a codified definition or approach – that of 'Assessment Methods, tools and procedures' (Brandon and Lombardi, 2011) or 'frameworks' (Gasparatos *et al.*, 2008)

There are now a very large number of these different assessment tools available to construction professionals and they will be considered here briefly. This is not an attempt to provide a *critique* in any way, but to provide further context to the specific area of interest for this research – Scotland – and the current situation with building assessment in that locale. In Brendan and Lombardi (2011) more than 61 different methods, tools or procedures are identified but Walton *et al.* (2005) identified nearly *700* applicable examples were identified – a number which will have undoubtedly been surpassed in the proceeding years.

Familiar tools, or assessment methods that have been applied to sustainability may include 'carbon footprinting' or 'ecological footprinting' (Kissinger *et al.* 2013); Life Cycle Analysis /Assessment (Ding, 2014)(Ortiz *et al.*, 2009); 'systems thinking' (Godfrey, 2010) For the construction industry in the UK, the most notable Assessment Method is BREEAM (Building Research Establishment Environmental Assessment Method) which offers different schemes for different non-domestic building types, while CEEQUAL, also delivered by BRE, is available for civil engineering projects. Prominent International versions include CASBEE (Comprehensive Assessment System for Built Environment Efficiency) from Japan and LEED (Leadership in Energy and Environmental Design) from the USA and Green Star in Australia. (AlWaer and Kirk, 2012)

While Schweber and Haroglu (2014) do warn against conflating assessment scores (citing BREEAM and LEED) with sustainable construction or "proxies for high-performance sustainable construction" it should be noted, as Thomson and El-Haram (2019) do that the 'dominant' Assessment Methods 'are slowly evolving the way they are applied in practice towards a framework approach capable of providing guidance to help projects promote best practice.' and that contribution cannot be underestimated.

2.8.2 Domestic and Residential Sustainability Assessment

For domestic buildings in the UK, the whole-building assessment began with *Ecohomes*, launched in 2000, but was ultimately phased out and replaced by the Code for Sustainable Homes (Pretlove and Kade, 2016) – a collaboration between the UK Government and BRE – which represented the main 'voluntary' environmental assessment scheme in the UK (except Scotland), although it was mandatory social housing projects for some time too. The Code for Sustainable Homes was introduced in 2005, with the aim of delivering the 'zero carbon new homes by 2016' target that the UK government had committed to as part of its aim to deliver key aspects of the overarching EU legislative commitments for 2050. (Pickvance, 2009) The Code for Sustainable Homes is also now retired, however, with the ascent of the 'Deregulation Act' of 2015[33] which altered (at the time) the UK's commitments to zero and near-zero housing. This ushered in changes to the Building Regulations (ibid), which have since become the practical, regulatory means of introducing sustainability-related improvements and mandatory performance for new-build homes.

Since the early 2010s there have been efforts to increase the requirements of the Building Regulations (termed the Building Standards in Scotland); beyond their original Health and Safety orientation to include increased mandatory levels for conservation of energy and materials or design factors covering aspects such as glazing and insulation, amongst other 'sustainability' requirements.

[33] The UK Parliament webpage on the Deregulation Act 2015: https://services.parliament.uk/bills/2014-15/deregulation.html (accessed 31 July 2019)

Internationally, the most established voluntary, domestic assessment method is undoubtedly *Passivhaus,* which began in Germany in the early 1990s but its use is also becoming commonplace across the UK (Heffernan *et al.*, 2015), over and above the mandatory performance required by the Building Regulations, or Building Standards in Scotland. The Passivhaus standard is heavily reliant on 'strict levels of airtightness, super insulation, limited thermal bridging and mechanical ventilation with heat recovery (MVHR)' (ibid).

2.8.3 The Scottish Building Standards

Although, on closer inspection, there are obvious similarities in the Building Regulations enforced in the rest of the UK and those in Scotland, they have for a long time been both different and distinct in Scotland, as is described by Liam Ross (2011). Although some premodern building codes did exit, it was through the 'Burgh Police Act' of 1833 that regulations were first introduced for the spaced outside buildings before the 'Public Health (Scotland) Act' of 1897 began to add stipulations for the inside of buildings. It was the post-war Building (Scotland) Act of 1959, however, where robust enforcement of mandatory standards of a range of issues was firmly established. The Regulations developed from there and then, in 2003, the Building (Scotland) Act introduced wholesale changes (ibid), which came into force in 2005[34] via the Building (Scotland) Regulations 2004[35] which, in turn, the production of the Scottish Building Standards, sometimes referred to as the 'Technical Standards' (Scottish Minsters, 2017). Under the terms of the 2003 Act mentioned above, the Building Standards are in place 'to ensure that new buildings and works achieve the objectives of the Act in terms of health, safety, welfare, convenience, conservation of fuel and power, and sustainable development.' (Scottish Minsters, 2017).

In light of the consideration in preceding sections of this chapter about 'definitions' that it is this term 'sustainable development' that is referred in the relevant legislation in the UK including, for example, the Climate Change (Scotland) Act (2009) (Scottish Parliament, 2009), the Building (Scotland) Act (2003) (Scottish Parliament, 2003) and

[34] Scottish Building Standards website: https://www.gov.scot/policies/building-standards/monitoring-improving-building-regulations/ (accessed 30 July 2019)
[35] The Building (Scotland) Regulations 2004 – Legislation webpage: http://www.legislation.gov.uk/ssi/2004/406/contents/made (accessed 30 July 2019)

the UK Climate Change Act (2008) (UK Parliament, 2008), which applies to the rest of the UK aside from Scotland. It is also interesting to note that, although these legislative documents do make several references to 'sustainable development' – either by referring to the need to make a 'contribution to' or to 'further the achievement of'' sustainable development – none provides much significant description or explanation of what that might mean or be defined as.

The Scottish Building Standards do offer the definition of 'Sustainable Development' and it has been defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs"'. This is, of course - as has been established above - a reference to the 'Brundtland' definition from the United Nations 'World Commission on Environment and Development' report from 1987[36] (Scottish Ministers, 2017) (WCED, 1987) Further to this, Section 7 of the Technical Handbook make the further claim that:

> *It follows that the process of sustainable development and the quality of 'sustainability' to aspire to within the built environment should account for:*
>
> - *social, economic and environmental factors*
> - *the potential for long-term maintenance of human well-being in and around buildings*
> - *the well-being of the natural world and the responsible use of natural resources, without destroying the ecological balance of the area where these resources originate or are processed, and*
> - *the ability for the built environment to be maintained.*

While it is not intended for this context chapter to be a springboard of criticism of criticism towards the Scottish Building Standards, it is worthy of brief comment. In the section quoted above and in light of the information provided earlier, it does seem remis of the Scottish Government to offer such little guidance and background to the what is being stated and, further to provide such scant context for how the abridged

[36] It is interesting to note that the Building Standards Technical Handbook have been wrongly claiming that the WCED happened in 1983 as opposed to 1987 since the introduction of Section 7 in 2011!

'Brundtland' definition that is provided necessarily results in the four bullet pointed claims that follow. As a guidance document for practitioners, it seems that there has been a missed opportunity to enhance the sustainability 'literacy' (Higham and Thomson, 2015) of the practitioners that interact with the Standards.

Turning to more practical aspects of the Scottish Building Standards – with the current version, at the time of writing being the 2017 Standards,[37] the sections of the Standards are: Section 1 – **Structure**, Section 2 – **Fire,** Section 3 – **Environment,**
Section 4 – **Safety,** Section 5 – **Noise,** Section 6 – **Energy,** Section 7 – **Sustainability**

Although it is not necessary to go into the detail of each section and its associated requirements, the following features are worth noting. First, is that, with the 2010 standards set as the 'baseline' (Scottish Ministers, 2017), compliance is achieved by meeting the requirements of Sections 1-6, which are regularly reviewed, and performance requirements enhanced. Ultimately, increasing stringency in the Building Standards will be aimed at making a contributing to the commitments of the Scottish Government, via the Climate Change (Scotland) Act 2009, which in 2018 revised the interim CO_2 emission targets for 2020, 2030 and 2040, culminating in 'net zero emissions' by 2050.[38] Lastly, is that Section 7 offers the opportunity to achieve 'enhance' levels of 'sustainability' by achieving more stringent performance levels above what is required in Sections 1-6, which awards 'Bronze'. The enhanced awards of 'Bronze Active', 'Silver', 'Silver Active', 'Gold' and 'Platinum'. Awards for enhanced specification under section 7 cover the 'sustainability' factors associated with: energy use, fuel use, water efficiency, mobility space, storage, noise and enhanced natural daylighting, security, outdoor space, recycling storage, and 'design for deconstruction'.

2.9 Context – Research Subjects

In the closing sections of this *Context* chapter, some brief consideration will be given to specific aspects of the research, looking more closely at the *boundaries* that have been

[37] Updated Standards are due to come into force on 1st October 2019. The Scottish Building Standards, Technical Handbooks webpage: https://www.gov.scot/policies/building-standards/monitoring-improving-building-regulations/ (accessed 30 July 2019)
[38] Scottish Parliament Climate Change (Emissions Reduction Targets) (Scotland) Bill webpage https://www.parliament.scot/parliamentarybusiness/Bills/108483 aspx (accessed 30 July 2019)

set for research subjects, location and professional sector along with some of the underlying reasons for this.

2.9.1 Why Scotland?

As has already been outlined above, Scotland has a *different* and *distinct* Building Regulation and legislation set-up to the rest of the UK for its built environment. The Scottish legislation is described by Meacham (2016) as 'world-leading' with respect to climate change measures and, is more stringent and ambitious than the minimum requirements set in the rest of the UK, In addition to this, is an 'interest factor' generated by the publication of the 'Sullivan Report' in 2007 (updated in 2013) (Scottish Ministers and Sullivan, 2007, 2013) which is inextricably linked to the ambitious climate change targets that have been set for Scotland. The Sullivan Report is pointedly aimed at the construction sector and is specifically laid out as a *strategy for the Building Standards* in Scotland which, arguably, is a feature absent in the rest-of-UK setting – even when considering the focus and content of historic and landmark Construction Industry reports, such as the Egan Report[39] or the Latham Report[40].

Further, since Scotland is a fairly small country, this gives a very clearly defined geographical boundary, but within that, also provides the opportunity to gain access to a variety of different research participants i.e. it provides the opportunity to access both the rural and urban setting with relative ease. With the research participants being architectural designers, as will be considered further, below, there is also the further 'regional' interest of Scotland also having its own, separate, Professional Membership body for architects. In Scotland, there is the RIAS (Royal Incorporation of Architects in Scotland), as opposed to RIBA (The Royal Institute of British Architects) although it should be noted that many Scottish architects are in fact members of both bodies.

[39] The Latham Report 'Constructing the Team' available at: http://constructingexcellence.org.uk/wp-content/uploads/2014/10/Constructing-the-team-The-Latham-Report.pdf (accessed 31 July 2019)
[40] The Egan Report 'Rethinking Construction' available at: http://constructingexcellence.org.uk/wp-content/uploads/2014/10/rethinking_construction_report.pdf (accessed 31 July 2019)

2.9.2 Why Domestic Buildings (Dwellings)

Under the Scottish Building Standards, as with other similar regulatory arrangements there are separate *domestic* and *non-domestic* Standards and, broadly, not permitting the inclusion of the non-domestic 'factor' is a pragmatic choice. As with the geographic boundaries discussed above, this choice also provides a helpful set of boundaries and deliberate limitations that help to minimise complexity. In addition to this, it is felt that different ownership model and client relationships that may be prevalent in the non-domestic sector would be an unnecessary distraction or element of uncertainty that is probably best avoided. Having said that, though, it is acknowledged that many participants are from 'mixed-practices' who have a workload consisting of both domestic and non-domestic projects and will undoubtedly take the experience of both sectors into the perceptions and opinions that they hold.

2.9.3 Why Architectural Designers?

While the main 'targeted' participant for this research is 'the architect', this has deliberately been broadened to that of the 'designer' or 'architectural designer' as described by Murtagh *et al.* (2015) to allow other design professionals, who may work in design practices and who also may be fulfilling the 'traditional' role of the architect, to take part. That is not intended to diminish the role of any other professionals in the construction process. It is, however, the 'designer' who is responsible for a design that complies with minimum regulatory standards and the designer, more than any other person, that is likely to be involved from the concept stages through to the construction phase. In so far as 'sustainability' is concerned, then, the designer resides in a fairly unique position with unique knowledge, occupying the 'middle out' position, described by Janda and Parag (2013) and who, as 'middle actors', have the best vantage point in the professional context.

With reference to the architect in particular, then, the following short sections will lay out some of the features of the profession that have a direct bearing on the context of this research.

2.9.4 Being an Architect in the UK

The RIAS provide the following guidance on what constitutes an architect in the UK:[41] [42]

- *Before a person can be called an architect, he or she will have completed a seven-year course in the design, specification and erection of buildings and passed the professional practice examination which is the final stage of an architect training.*

- *Passing the professional practice exam gives entry to the list of UK Architects held by the Architects' Registration Board (ARB), and use of the title 'architect'. Thereafter, application can be made to one or both of the chartered professional bodies which entitle members to use the term 'chartered architect' and the following initials: RIAS / FRIAS (Royal Incorporation of Architects in Scotland), RIBA (Royal Institute of British Architects). An architect may also use the initials RSUA (Royal Society of Ulster Architects) or RSAW (Royal Society of Architects in Wales).*

- *There are no shortcuts to becoming an Architect. Typically, you will require five years of academic study (Parts 1 and 2) before obtaining full time employment and another two-years minimum before you gain professional registration (Part 3)*

One key feature to note from this is the role of the ARB ((Architects Registration Board) – a separate entity to both the RIAS and the RIBA (and, by implication RSUA[43] and RSAW[44]) who maintain the national 'register' of architects, while it is RIBA and RIAS who have membership based on 'chartered' status. It is important to note, then, that ARB is the UK's *statutory* body for architects, while the RIBA (or RIAS, RSAW, RSUA) is a *membership* body for the profession.

Further to this, it is also the ARB, under the Architects Act of 1997 who hold responsibility for 'prescribing the qualifications and practical experience required for

[41] The Royal Incorporation of Architects in Scotland (RIAS) information page on 'Choosing and Architect' https://www.rias.org.uk/for-the-public/why-use-a-chartered-architect/choosing-an-architect (accessed 30 July 2019)
[42] The Royal Incorporation of Architects in Scotland (RIAS) information page on 'Becoming and Architect' https://www.rias.org.uk/for-students/becoming-an-architect (accessed 30 July 2019)
[43] The Royal Society of Ulster Architects
[44] The Royal Society of Architects in Wales

entry onto the UK register of architects'[45] and, as such, determine both the acceptability and suitability of an architecture school's syllabus and training for the courses that they offer.

Both the ARB and the RIBA have their own separate 'Codes of Conduct'. The ARB version is entitled 'Standards of Professional Conduct and Practice') and the RIBA version is called the 'Code of Professional Conduct' and which must be adhered to, to retain membership.

The ARB code – which the RIAS also aligns to[46] – is applicable to individual architects and consists of 12 standards[47] covering different aspects of honesty, integrity, trustworthiness and business practices. The RIBA Code of Professional Conduct,[48] is also applicable to individual members, although they do have a further, similar code that is directed at 'Chartered Practices and their staff'. The RIBA code is more expansive that the ARB and includes 33 stipulations, covering a much broader range of requirements under the three 'Principles' of *Integrity*, *Competence* and *Relationships*. The full list of requirements for both the ARB and RIBA Codes of Conduct can be found in Appendix B and C respectively.

While the RIBA Code is clearly more far reaching, and understandably so, due to the enhanced level of membership that they cover, there is one notable difference that it is surprising to note – that of competence requirements. The RIBA offers substantial CPD (Continuing Professional Development) resources and guidance and, indeed, has several 'registration' requirements attached to it. The RIBA also has an annually updated 'Core CPD' programme through which 10 specific topics are covered and

[45] The Architects Registration Board (ARB) 'Criteria for the Prescription of Qualifications' webpage http://www.arb.org.uk/information-for-schools-of-architecture/arb-criteria/ (accessed 31 July 2019)
[46] The Royal Incorporation of Architects in Scotland (RIAS) information page for the statement of professional conduct: https://www.rias.org.uk/members/statement-of-professional-conduct/ (accessed 31 July 2019)
[47] The Architects Registration Board (ARB) 'The Architects Code: Standards of Professional Conduct and Practice available at: http://www.arb.org.uk/wp-content/uploads/2016/05/Architects-Code-2017.pdf (accessed 31 July 2019)
[48] The Royal Institute of British Architects (RIBA) Code of Practice May 2019 https://www.architecture.com/-/media/gathercontent/work-with-us/additional-documents/riba-code-of-practice--may-2019pdf.pdf (accessed 31 July 2019)

offered nationwide through the course of a year.[49] The 2019 'sustainability' topic, for example, is entitled 'The big wins: deliverable and cost-effective sustainable design solutions'.[50] In the ARB Code, however, there is no mention of CPD in any form. Again, while there are no serious endeavours to offer an extensive critique here either, it is still a notable absence in the practice requirements laid down by the ARB.

2.9.5 The RIBA Plan of Work (2013)

Finally, in terms of providing context for this research, is a brief look at the RIBA Plan of Work 2013. The Plan of Work was first established in 1963 as a model 'process' or workflow for the design and construction of buildings (RIBA, 2013). The latest iteration is the 2013 version and represents a significant change to previous versions – changing the project process from 12 Stages (A-L) to 8 Stages (0-7) and 8 associated 'task bars'[51]:

Stage 0 – Strategic Definition
Stage 1 – Preparation of the Brief
Stage 2 – Concept Design
Stage 3 – Developed Design
Stage 4 – Technical Design
Stage 5 – Construction
Stage 6 – Handover and Close Out
Stage 7 – In Use

What is crucial to note, now is that there is a sustainability 'checkpoint' at *every* stage of the Plan of Work, rather than the previous 'green overlay' that accompanied the Pan of Work. And, further there are other, specific, sustainability requirements, outlined in tasks such as identifying 'sustainability aspirations', developing a 'sustainability strategy' and the requirement to include 'sustainability' in the project brief. It is also of note that the RIBA Code of Professional Conduct also contains the specific requirement

[49] The Royal Institute of British Architects (RIBA) Core Curriculum 2019: https://www.architecture.com/education-cpd-and-careers/cpd/riba-cpd-programme/core-cpd (accessed 31 July 2019)
[50] The Royal Institute of British Architects (RIBA) Core CPD seminar on sustainability https://www.architecture.com/education-cpd-and-careers/cpd/riba-cpd-programme/Cost-effective-sustainable-design-solutions (accessed 31 July 2019)
[51] From the Royal Institute of British Architects (RIBA) 'Concept and Comparison' 2007 v2013 webpage: https://www.ribaplanofwork.com/About/Concept.aspx (accessed 31 July 2019)

under section 8 of 'Competence' to use the RIBA Plan of Work to ensure successful handover of a building.[52]

The RIBA Plan of work, then, legitimately claims to be a crucial guidance document for the architect or designer that 'a bedrock document for the architects' profession and the construction industry, providing a shared framework for the organisation and management of building projects' (RIBA, 2013) and which, in conjunction with the Building Standards, should ensure the effective consideration of sustainability on a building project.

2.10 Research Questions

When considering the information provided both in this chapter and Chapter 1: Introduction, there are several questions that emerge as to what can be learned from an exploratory study like this. Questions arise around how designers view the issue of sustainability – both as a concept and as a deliverable – and how much a designer's perceptions of sustainability influences their approach to meeting, or surpassing, the requirements of the Building Standards. Questions also arise around how far these perceptions influence their personal design philosophy and the impact this might have on their final designs. Further, is the effect that their ongoing professional experiences and CPD programme has on their sustainability *literacy* – a factor that has been considered previously by Higham and Thomson (2015) working with Construction Professionals and considered in general terms by Stibbe (2009).

More specifically to the Scottish context, questions arise as to how appropriate designers think it is to implement 'sustainability' measures via the Building Standards, whether this leads to a 'minimum compliance' approach and also whether, and to what extent, the enhanced levels of 'sustainability' that can be achieved under the Scottish Building Standards have influenced their personal design philosophy.
As indicated in Chapter 1, and in light of the further context that has been provided in this chapter, the final section in this chapter will lay out the Aims and Objectives for this research, as is seeks to answer the questions that have been offered above.

[52] The Royal Institute of British Architects (RIBA) Code of Practice May 2019 https://www.architecture.com/-/media/gathercontent/work-with-us/additional-documents/riba-code-of-practice--may-2019pdf.pdf (accessed 31 July 2019.)

2.11 Aims and Objectives

Research Aims

1. To understand the perceptions of sustainability that exist amongst 'architectural designers' in order to develop insights into the relationship between sustainability policy and practice.

2. To identify, and develop, *pragmatic* and *directly applicable* recommendations for the further development of a) sustainability policy and b) the education and professional development of architectural designers in Scotland.

Research Objectives

a. To investigate how perceptions of sustainability may differ across a group of architectural designers and the factors that may be influencing the differences.

b. To investigate how architectural designers perceive *their role* in delivering sustainability and 'furthering the achievement of sustainable development'.

c. To investigate the extent to which the Scottish Building Standard promote sustainability 'literacy' and a more holistic understanding of sustainability and sustainable development amongst design professionals.

d. To investigate the extent to which design professionals believe that their role is instrumental to the sustainability of the built environment and the achievement of sustainability objectives.

e. To identify factors that architectural designers perceive as being barriers to the achievement of sustainability objectives and, further to this, to identify ways in which these factors might be lessened.

f. To provide recommendations for stakeholders in the research output, that will contribute to their future roadmap and a pragmatic pathway towards improvements in the services that they provide

2.12 Chapter 2 Summary

In this chapter, the context for this research has been set out, incorporating a review of some of the relevant literature. First, the context has been provided in terms of historical background, including the developing of an understanding of sustainability and climate change issues and the legislation and regulation that has been developed to address these problems. Second, specific context has been provided relating to the research boundaries of this project, namely, an investigation of the perceptions of sustainability that are held by architectural designers in Scotland.

In the following chapter, Chapter 3: *Methods and Methodology,* the philosophical assumptions for this research will be considered along with a description and underlying rationale for the specific methods that will be used in this research.

CHAPTER THREE

METHODS AND METHODOLOGY

'It is not enough to have a good mind;
The main thing is to use it well'

René Descartes (1637)

3.1 Introduction

The chapters prior to this have provided both an introduction to the research and a more detailed context surrounding the subject matter and a discussion around some of the key literature. This chapter outlines the research approach taken in this thesis. In doing so, the underlying philosophical research paradigm will be unpacked a little before an exploration of the methodology and resultant styles adopted and methods used. This will include not only discussion on the methods that were adopted but also some consideration of other relevant methods that might typically be used in similar research. The chapter then provides a closer look at the issues surrounding the qualitative method of interviews and, specifically, the *semi-structured interview* which has been selected as the principal method of gathering primary data in this research project. This will lead into, and lay the foundation, for further chapters that directly relate to these issues (Chapter 4: *Data Collection* and Chapter 5: *Data Analysis*).

3.2 Research Domain

Broadly, this research falls under the domain of 'Construction Management Research' or, as Schweber (2015) puts it, simply 'construction research' i.e. research centring on a 'domain-based field'. Construction Management Research is diverse and is adaptable enough to be able to incorporate a vast range of associated fields and topics of related interests. This is readily demonstrated, for example, by looking at the highly varied output and research tracks of organisations such the American Society of Civil Engineers (ASCE) and their Construction Research Congress[53] or, in the UK, through ARCOM (The Association of Researchers in Construction Management) (ARCOM, 2018). This might also go some way to help underpin what Schweber (2015) notes about construction researchers in that they might traditionally tend 'to be eclectic about theories and approaches, treating them as tools to be mobilized rather than as perspectives to be explored.'

[53] For an example of the variety of output in this area, see here: ASCE (2019) Proceedings of the Construction Research Congress. https://ascelibrary.org/proceedings?CategoryKey=10.1555%2Fcategory.40088406&startPage=&CategoryKey=10.1555%2Fcategory.40116360 (Accessed 18 June 2019).

Construction Management Research may still be considered a relatively recent addition to the halls of academic enquiry, having established itself as a research field during the 1980s, and this emergence is something that that has been explored in some depth by both Harty (2008) and Dainty (2007a). Typically, Construction Management Research is found to be aligned with the natural sciences in both its approach and method, as described by Sherratt (2013) and in Harty (2008), where it is noted that the most commonly applied models of research and theory development tend to be 'positivistic, instrumental, objective and rational in orientation'. Further to this, Dainty (2007a) adds that there is also a rooting in an objective, realist ontology and a positivist epistemology. As a consequence of this, Construction Management Research is usually both quantitative and empirical in design. Meanwhile, the typical research 'model' as applied to Construction Management research is described by Harty (2008) as:

> *…positivistic, instrumental, objective or rational in orientation, has looked to reveal underlying causes which explain the 'nature' of the workings of the construction sector. It has based its methodological rigour on accepted scientific practices of deductive and quantitative empirical research.*

This dominance of positivism in this research field has been well visited in the literature and has been the subject of numerous papers and counter-papers that, for example, can be found across several volumes of the journal *Construction Management and Economics* during the 1990s. The debate began with two papers (Dainty, 2007a) – one by Seymour and Rooke (1995); and one by Seymour, Rooke, & Crook (1997). These papers questioned the dominance of positivist research in the field of Construction Management Research and furthermore, the self-reinforcing effect this was perpetuating. A rebuttal to these claims were made by Runeson (1997), Raftery (1997) and Harriss (1998) including the assertion that a move away from positivist approaches would make the research less scientific and that interpretivist or anti-positivist approaches were only useful for building hypothesis rather than testing them. This debate further highlighted the need for clarity around the terms 'method', 'methodology' and 'paradigm' (Seymour, Rooke, & Crook, 1997) and, indeed, as Dainty (2007a) notes this debate did lead to a greater effort being expended by researchers to carefully state the philosophical assumptions of their research and this, in turn, did probably play its part in the dissipation of the debate.

3.3 Research Design

'Research Design' describes the relationship between research questions and the available data that will be used to answer the questions, along with the analytical approach used to do this, thus, providing a 'framework' for the research (Bryman and Bell (2003) These factors rely on philosophical and theoretical assumptions being clearly defined by the researcher, outlining the epistemological and ontological positions that have been adopted and, therefore, the 'paradigm' that is being applied to the research. To understand this better, Punch (2005) provides a helpful description of a research paradigm as being a 'broad term' and 'a set of assumptions about the social world and about what constitutes proper techniques and topics for enquiry', while Dainty (2007b) points out that 'research methods cannot be viewed in isolation from the ontological and epistemological position adopted by the researcher.'

3.3.1 Theory as Applied to this Research

In line with this, then, the ontological and epistemological assumptions for this research must be situated. Ontology is concerned with how a person understands themselves and their own personal experience of reality. This is described by Fellows and Liu (2008) as 'assumptions in conceptual reality and the question of existence apart from specific objects and events.' and by Barbour (2008) as referring to 'our views as to what constitutes the social world and how we can go about studying it.' Epistemology, on the other hand, is concerned with knowledge or 'theories of knowledge'... that 'attempt to answer questions surrounding the nature of knowledge, its limits and how to acquire it' as described by Knight and Turnbull (2008). For Mason (1996), it concerns 'the principles and rules by which you decide whether and how social phenomena can be known, and how the knowledge can be demonstrated'. As Bryman (2015) further notes, it may also be more simply understood as referring to what would be considered as 'accepted knowledge in a discipline'.

For Love *et al.* (2002), Construction Management Research sits neither fully in the natural sciences or social sciences, but, at an 'intersection' between them. While traditional natural science approaches have predominated, social science approaches – that is, research that is 'interested in what people do, how they interact and organise, and in the interplay between individuals, organisations and wider societal institutions'

(Harty, 2008) – have become more established in the field in the early years of the 21st Century.

In addition to this are the often used and corresponding distinctions of 'quantitative' research methods, typically allied to Positivist approaches and 'qualitative' research methods, typically allied to Anti-Positivist or Interpretive approaches, that should also be noted. *Quantitative* methods are ordinarily concerned with gathering, numerical data or data that can be derived numerically, whereas *qualitative* methods are ordinarily concerned with the analysis of non-numerical data. As Dainty (2007b) explains:

> *In broad terms researchers adopt either an objective 'engineering orientation' where the emphasis is on discovering something factual about the world it focuses on, or a subjectivist approach where the aim is to understand how different realities are constituted. Whilst the former emphasises causality and generalisability*[54]*, the latter focuses on localised subjective meaning.*

So, while the specific context of any research may further result in claims of objectivity and subjectivity to different degrees, both approaches may normally be regarded as 'empirical' in their own application and it is therefore the type of knowledge or output being sought that will dictate which method is adopted. The Interpretivist approach should also not be considered as any less *robust* either, as Schweber (2015) notes:

> *…just as positivism combines both theory and empirical data in practice, so too interpretivist research involves an iterative process whereby theory is used to specify initial constructs, which are used to begin exploring an empirical case, which in turn provides the basis for theoretical revision and redefinition.*

Paradigmatically, this research might be well situated – in broad terms at least – under an Interpretivist paradigm *framework*, inasmuch as there is the anticipation that this helps 'researchers to rein in or move beyond their own subjective opinions and

[54] Generalisability in this sense is referring to repeatability in the way an experiment would be repeatable, and the results then applied generally to similar situations. This does not negate the possibility that this research, allowing for aspects for a more subjectivist approach cannot be 'generalised' i.e. the exploration of generalised *meaning* – and this will be discussed further later in this chapter and in Chapter 6: Discussion

common-sense views of their research object.' (ibid) It does not, necessarily, sit completely at ease under 'pure' interpretivism and, indeed, does not attempt to do what Schweber proposes above in terms of the use of theory to form constructs with the goal of revising that underlying theory.

In attempting to further situate this research under a suitable *ontological* and *epistemological* position, there are several attractive options that are seemingly suitable.

In research such as this, it is not a straightforward task to situate it effectively within a theoretical framework for both its epistemological and ontological perspective and several aspects of this will be further explored and defended below. There also must be an attempt to 'position' the research in terms of both the desired outcomes and the context that it takes place in and this must be done with reference to the realistic limits of the research and researcher in the given research situation.

Initially, a rationalist ontology was thought to be the most appropriate 'lens' through which to view this research matter. This was supported by the understanding, as described by Graziano and Raulin (1997) as 'a way of thinking in which knowledge is developed through reasoning processes alone' and can 'aid in developing hypotheses' Rationalism in this sense, then, can be viewed in a form of opposition to *Positivism* or *Empiricism* which would posit that knowledge is gained 'through observation of real events; that is, *knowing by experiencing through our senses.'* (emphasis in the original) (ibid) i.e. observation in the traditional sense of repeatable or replicable experimentation, for example. A Rationalist, ontology, then, holds that human beings have the ability to understand the world and society that they are in (Uddin and Hamiduzzaman, 2009).

However, the outcomes of this research are intended, but not limited to, producing directly applicable and *pragmatic* guidance for the industry, educators and practicing designers alongside an improved understanding of how designers think and are affected by their broad regulative and particular work contexts *generally*[55]. As such, it is

[55] See footnote 2

felt that the philosophical positioning of this research would benefit from a slightly more positivist ontological position i.e. a form of objective *realism*, whereby the assumption is held that 'reality exists independently of observers' (ibid)

It is therefore considered that the most suitable 'compromise' for the ontological assumptions of this research is that of *critical realism*. As Braun and Clarke (2006) outline, this approach allows for an acknowledgement of:

> *…the ways individuals make meaning of their experience, and, in turn, the ways the broader social context impinges on those meanings, while retaining focus on the material and other limits of 'reality'.*

The application of *realist* ontological assumptions, while not being as constraining to this research as a positivist ontology would, it does assume the presence of a known, external reality that is independent of the researcher. When utilised in conjunction with Interpretivism, as will be outlined below, and the assumptions of subjectivity that are provided by that epistemology, the allowance for drawing out meaning from the interviews still persists. Thus, the *critical* element ensures that the views (data) provided by participants can be considered *critically*, with reference to the surrounding context of what they offer to gain the insights that this research seeks.

Critical realism is not without its doubters and, while it is noted that some hold that the objective realities presented 'are constructed through the interactions and interpretations of people', (Fellows and Liu, 2008) it is considered, here, to be the most suitable position to underpin the ultimate aims of this research. Further to this, it is also crucial to note, as Braun and Clarke (2006) do, that some *methods* can be used, independent of a necessity for a specific theoretical position and can be applied across a range of different positions. This is important to this research as this 'theoretical freedom' (ibid) gives further justification, if it were needed, for the use of 'thematic analysis' as will be explained in Chapter 5: *Data Analysis* and utilised across Chapter 6: *Discussion* and 7: *Conclusions and Recommendations.*

Conversely, the most appropriate epistemological position for this research has proved somewhat more straightforward to determine and is deemed to be that of *Interpretivism* – a form of anti-positivism, which itself is often closely aligned to the constructivist approach. As Schweber (2015) explains:

> *Whereas positivism is a relatively coherent epistemology, interpretivism covers a variety of quite different approaches, including: constructivism, phenomenology, ethnomethodology, pragmatism and post-modernism.*

There are several reasons why the interpretivist perspective is deemed appropriate for this research. The principal subject matter of this research study is people, in that, it is the perceptions of people towards the contested, if not elusive shared understanding of sustainability. Since positivist approaches 'tend to use statistics to make probabilistic claims...' allowing them to '...quantify initially observed patterns and to identify probabilistic rather than certain laws' (ibid), this can hardly be applied to people and the perceptions that they hold, as this an endeavour is much better suited to qualitative approaches (Fellows and Liu, 2008).

Further to this, Fellows and Liu (ibid), with reference to the Interpretivist approach, state that:

> *One person's reality, derived by observations and perceptions and modified by socialisation (upbringing, education and training) is likely to be different from another's… so, researchers should endeavour to determine truth and reality from the participants' collective perspective(s) – to see things through their eyes.*

It should be noted, too, that there is the danger of stopping short in an interpretivist study by not moving beyond 'rich description' towards a 'reflection on the implications' of the analysis carried out, to provide more generally applicable understandings (Schweber, 2015) Interpretivist research, it should be remembered, is 'more than just an opinion' and requires reflexivity (ibid and Dainty, 2007a)

In all this, the *aspiration* to be able to position this research neatly under a 'pure' form or rationalist interpretivism, where the depth of insight and development of sophisticated hypotheses may be garnered – does stand. However, in seeking to fulfil

the aims that have been outlined for this research, to avoid placing a burden on this research beyond what can be realistically achieved and in acknowledgement of the limitations that have to exist for the scope for research such as this, the more pragmatic approach is deemed more appropriate.

This is in no way intended to diminish the depth of insight that may be gained or, indeed, the richness of meaning that is discovered from the interview data but the 'critical' aspect of *critical realism*, when combined with interpretivism provides for a pragmatic and realistic set of expectations for the researcher. As such, the adopted approach does allow for the exploration of meaning, as will be explored more in proceeding sections, while acknowledging that there has to be a *critical* consideration of the data provided by participants – placed in the context of the broader social and cultural realities that are present.

When reflecting, as one should when undertaking interpretivist research, there is room for some reflective remarks on how the implementation of this approach played out in practice to help build a narrative around the implications that will be further discussed in Chapter 6: Discussion. First, it is worth noting that there are, indeed, acutely tangible limits to what can be learned in some circumstances. At the same time, it is important to maintain as natural interaction with a participant as possible, that avoids veering towards 'leading' the participant, or worse, inadvertently putting words in their mouth. There is the very real danger present then, as was acutely felt in some of the interviews in this research, of pushing for an answer where the participant actually didn't have much to say about a point that was raised and had perhaps not given it any of thought prior to it being mentioned in the interview.

Additionally, it is worth noting that the philosophical approach or position need not impinge on the 'event' of the interview. It is, of course, important to be cognisant of the theoretical and philosophical landscape in all of these processes but it is also important to just let the interview happen and allow it to be as natural an interaction as possible. This notion of interaction, and it's differing facets, will be discussed further in later sections, but lastly, here, is to note the lasting recognition that as vital as the philosophical side of the research undoubtedly is and, it certainly provides the

underlying rationale for the validity of such interviews - when conducting these interviews, it was also important ensure that the interviews did not become perfunctory events due to an overbearing sense of adhering to a philosophical at every juncture or due to a similar sense of duty towards extracting all available knowledge out of each participant for each question raised.

3.4 Typology

One of the difficulties in situating, describing or categorising the different variations of qualitative approaches is that, as noted by Barbour (2008), there are often several variations and iterations of any approach that may be adopted. This can be influenced by an 'idiosyncratic constellation of specific techniques, methodological and philosophical approaches' (ibid) as well as:

> *…individual motivations and different sorts of curiosity… in a way that is congruent with their own preferred position and disciplinary legacy, choosing to emphasise some aspects or properties and de-emphasise others. (ibid)*

This makes it particularly difficult to produce a 'definitive typology'. So, while there is a clear intention demonstrated in this research to be situated within a *Critical Realist, Interpretivist* approach, it could also be seen as sitting somewhere on an imperfect spectrum. This spectrum might have Positivist or Realist at one end, as referred to above, and Constructivist or Relativist at the other with myriad possibilities for variations and combinations in between them. Indeed, and as has already been asserted, while this research is situated within an Interpretivist framework or *paradigm*, there is also the potential to draw upon alternative philosophies – particularly with reference to the research interviews – such as 'Perspectivism' which would state that '…knowledge of the world is a function of the linguistic and conceptual framework within which particular knowers and agents live and operate' (Fay, 1996). For writers such as Dainty (2007b), who are proponents of 'methodological pluralism' within Construction Management Research, there can be significant advantages gained with the application of different approaches, to counter the prevailing positivist approaches, which in turn may:

> *…move the research community towards a more methodological outlook… A more expansive outlook towards mixing methodologies and research paradigms could yield deeper insights into, and understanding of, the way that practitioners 'do' management in the construction sector. (ibid)*

What is important to understand by not moving to the opposite 'extreme' when rejecting or, at least, not adopting a 'pure' Positivist or Realist approach – particularly where this research is concerned – is the role of *language* and some further aspects of this will be touched on in further sections below. For the Rational Interpretivist, the role of language is representative of cognitive function which, in turn, allows for claims of be made of values and beliefs and, crucially, generalisable *meaning.* For the Constructive Relativist, for example, language is no longer representative of cognitive function since the social world is merely a construction. It is not really therefore possible to go much beyond the 'face value' of the words expressed.

3.5 Research Approach

In addition to what has already been discussed – but in many ways very similar – there is the consideration of the research *approach* that is adopted in qualitative research. This, in turn, influences the research *style*, or the adoption of a particular method or set of methods to obtain data, which will be discussed further below. The research *approach* also helps to provide any framework that is required to shape the research design and any further theoretical or philosophical considerations as the research progresses. Five different Research Approaches for qualitative inquiry are identified and described by Creswell and Poth (2017) in the following terms:

- *Narrative Research*: 'Exploring the life on an individual' [or multiple individuals]
- *Phenomenological Research*: 'Understanding the essence of the experience'
- *Grounded Theory Research*: 'Developing a theory grounded in data from the field.
- *Ethnographic Research*: 'Describing and interpreting a culture-sharing group'
- *Case Study Research*: 'Developing an in-depth description and analysis of a case, or multiple cases.

In order to describe the approach that best fits this research, the following figure also helpfully breaks down the approaches, as aligned with the needs of both the *Research Focus* and the *Research Problem:*

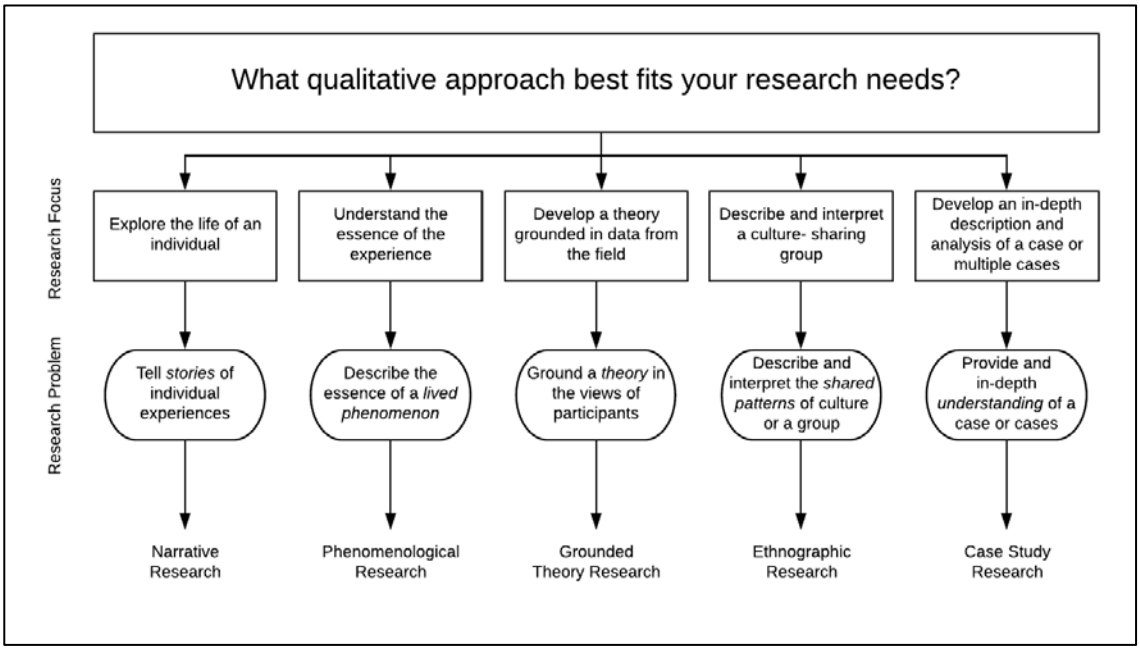

Figure 3.1 Qualitative Research Approaches – From Creswell and Poth (2017)

The approach to be adopted in this research comfortably sits somewhere between a Narrative Research approach and a Phenomenological Research approach, although it is probably much closer to the latter than the former. This is because the undertaking of multiple interviews for this research, as will be described in the following chapter, is less about the strictly individual experiences of individual persons and more about gaining an understanding of how these individual experiences can be used to build an understanding of the collective experience for a group of people who are fulfilling similar roles in both society and their common industry. This has the added context of these professionals having to fulfil much the same legislative and professional requirements in relation to their interaction with the role they play in 'delivering' sustainability for the built environment in Scotland today. In that sense, so far as the sustainability element goes, the shared phenomenon is simple *being* an architect in Scotland today. Crucially, too, it is worth noting that neither the 'research focus' nor 'problem' for this research aligns well with any of the other three approaches outlined here.

What is interesting to reflect on here, with respect to the notion of being an architect, is that it wasn't always possible to conjure or inspire this kind of perspective from participants naturally as the interviews took place. On subsequent analysis, aided by the techniques laid out and relied upon in later chapters, of course, this sense can certainly be drawn out. During the interviews it was sometimes possible for participants to conceive of themselves in such a manner, however, as is similarly reflected in earlier sections of this chapter it did not always represent thoughts and perspective that were 'front and centre' or could easily become so for a participant when raised.

In addition to the Research Approaches described earlier in the section – and something that Creswell and Poth (2017) describe data procedures for both a Phenomenological and a Narrative Research Approach in very similar terms – the most appropriate form of data collection for both approaches are *interviews with individuals* and documents. Meanwhile, the strategy for data analysis, which will further described in Chapter 4, is (as it is noted for Phenomenological Research too), the analysis of data for 'significant statements, ***meaning units*** (emphasis added), textual and structural description, and the description of the "essence"'(ibid). Whilst this research is not

3.5.1 Meaning and Interpretation

The reason that an approach which allows for the derivation of *meaning* is important to this research is because of the centrality of drawing out the 'themes of the lived daily world from the subjects' own perspective' as outlined by Brinkmann and Kvale (2015). Taking the form of semi-structured interviews – that is – interviews that are, in essence, intended to 'research other persons' worlds' (Fellows and Liu 2008) it is the intention of this research to find *meaning* from the information gleaned from the interviewees.

To begin to draw out meaning from interview data i.e. the interview text, it must go 'beyond a structuring of the manifest meanings of what is said to deeper and more critical interpretations of the text' as is noted by Brinkmann and Kvale (2015), who also outline a number of issues to be wary of when undertaking the interpretation of interview data.

This includes, firstly, the issue of 'multiple interpretations' which is the situation that, understandably, emerges when different people in differing contexts interact with the same interview data. In the context of this research, the analysis and interpretation of the interview data will only be produced by one person, and it is therefore possible that other people reviewing the data might interpret things differently. However, it does not necessarily follow that the meaning and interpretation need necessarily be so different that they would nullify or contradict each other.

Secondly, the issue of 'hermeneutical interpretation' is outlined, which is the interpretation of texts – usually scriptures, legal and literary works– and the problems that emerge when interpreting the intention of the author for how the written text should be understood. In this case, of course, the transcribed interview can be a source of written text to be understood. The hermeneutical aspect is less relevant in this research but is nonetheless important to note, and in particular the importance of distinguishing between 'biased' and 'perspectival' subjectivity, where it is noted that:

> *A biased subjectivity simply means sloppy and unreliable work; researchers noticing only evidence that supports their own opinions, selectively interpreting and reporting statements justifying their own conclusions, and overlooking any counterevidence. A perspectival subjectivity appears when researchers who adopt different perspectives and pose different questions to the same text come up with different interpretations of the meaning. (ibid)*

In attempting to adopt elements of a perspective subjectivity in the analysis of interview data, then, it is possible to increase the 'fruitfulness and the vigour of interview research' (ibid) but also begin to address some of the issues related to 'multiple interpretations' that were noted above.

Lastly, here, the issue of finding the 'real meaning' is raised by Brinkmann and Kvale (ibid) which, of course, does not refer to the discovery of some incontrovertible and singular 'truth' in the information provided by an interviewee – just waiting to be discovered. Rather, it is the development of a greater and broader understanding of meaning in terms of 'descriptive nuances, differences and paradoxes' (ibid)

The exercise of interpreting involves 'meaning clustering', the term used by Creswell and Poth (2017) or 'meaning condensation', the term employed by Brinkmann and Kvale (2015). It is interesting that Brinkmann and Kvale also stress that in meaning condensation for a phenomenological approach, 'it becomes paramount to obtain rich and nuanced descriptions of the phenomena investigated in subjects' everyday language' – which, it is felt, is precisely what the interviews undertaken in this research have provided. In practical terms, the clustering or condensation of meaning takes place throughout the research process as Creswell and Poth (2017) explains: 'Data interpretation is structured as well as unstructured, occurs throughout, and ultimately meanings are created as the research unfolds'. This condensation ultimately manifests itself in the coding and themes that are presented in the research, but the building blocks for these codes and clusters of meaning are laid from the beginning of the research when the exploration of the topic begins, questions are formulated and interactions with research subjects and data sources take place – potentially long before any formal interviews take place, even.

With the interpretation of meaning and, specifically, under the interpretative *paradigm*, as Altschuler and Brownlee (2016) also highlight, meanings unfold as research progresses and data is interpreted:

> *The interpretivist paradigm does not aim to generate representative samples, omit bias, or generalise results to similar populations, but instead allows for researchers to capture and understand in-depth insights and diverse opinions (Creswell and Poth 2017).*

Further to this, when considering how the concept of meaning operated in the context of the interviews themselves, it wasn't something that was deliberately illuminated for participants or mentioned as become part of the outcome explicitly. In fact, on further reflection, attempts to provide detailed explanation would probably have introduced an unhelpful distraction and unnecessary, tangential commentary in both directions. Since the participants themselves did not need to conceive of this output of *meaning* for the research analysis to be successful contributors it may also have unduly interacted with the participant's involvement, has it been discussed in any detail in the interview preliminaries.

Although largely related to the analysis and interpretation of data that will be discussed in Chapter 5, and will continue into Chapter 6, it seems appropriate at this point in the discussion to briefly introduce two concepts that are directly related to the methodology, and which largely emerged and developed in the qualitative literature during the 20th Century. As such, a researcher should be at least partly mindful, and aware, of the following when analysing and interpreting interview data – that of *Verstehen* and *The Linguistic Turn.*

3.5.2 Verstehen

In simplistic terms, *verstehen* is merely the German translation – albeit imperfectly (Harty, 2008) – for the English word 'understanding or 'meaningful understanding' (Donohoe, 2010) but in sociological research terms it has come to mean far more than that due to the introduction of the term by German Sociologist Max Weber (Weber, 1947) and is 'often taken as one of the intellectual precursors to the qualitative research approach (Bryman, 1988).

Weber identifies two types of understanding: Firstly, is *direct observational* understanding which concerns the 'subjective understanding of a given act' (Weber, 1947) and describes, for example, how a certain facial expression can be interpreted as signifying a particular emotion. (Bryman, 1988) Secondly, is *explanatory* or *motivational* understanding which describes how a 'particular act has been placed in an understandable sequence of action, the understanding of which can be treated as an explanation of the actual course of behaviour' (Weber, 1947) An *explanatory* understanding in the facial expression situation described above, then would be to probe the motive for the anger (Bryman, 1988)

A further, useful way of conceiving of the concept of verstehen is provided by Harty (2008) in that:

> *Verstehen is not just intuition on the part of the researcher, although the concept has been criticised as being just that. It is rather the foundation of systematic and rigorous attempts to understand the empirical world, both at the level of the subjective states of individuals, and the subjective aspects of large-scale social systems.*

3.5.3 The 'Linguistic Turn'

Whist not representing a concept that is of *critical* concern to this research, it is nonetheless important to note as it provides a rationale that helps underpin the validity of this research inasmuch that the analysis being conducted here is, in essence, that of the spoken word i.e. language. Although this research is not designed to be a theoretical work in the field of analytical philosophy, it is important to note here the presence of the 'linguistic turn' and the philosophical landscape that surrounds it.

With roots in the 19th century (Beaney, 2013), the linguistic turn took place in the early 20th century and is integral to the development, at that time, of the methodology of *analytical philosophy* which Beaney (ibid) asserts has 'now ramified into all areas of philosophy, diversifying in its methodology, ideas, and positions' and is 'now generally seen as the dominant philosophical tradition in the English-speaking world'. Indeed, it has been erroneously held that the linguistic turn itself spawned the field of analytic philosophy (Glock, 2008) and (Beaney, 2013). Whilst originating with Wittgenstein, the erm 'linguistic turn' was introduced by Gustav Bergmann in 1960 and later reinforced with the work of Richard Rorty in 1967 in his collection 'The Linguistic Turn' (ibid)

In short, the linguistic turn concerns itself with the relationship between *language* and *reality* or *meaning making*. Going beyond what can be discovered in a mere linguistic analysis, this change in philosophical direction that took place was a recognition that the words that people use and the language that they speak is intrinsically linked to the reality that they experience. As Hacker (2018) notes, 'the expression 'the linguistic turn' is useful to signal an important shift in meta-philosophical reflection and in philosophical methodology that occurred in the 1920s'.

3.6 Research Styles

The research *style* adopted for this thesis is the interview and, specifically, the semi-structured interview – as will be discussed in further detail below and in the proceeding chapters. When considering the possible styles that may be applied, there should be some consideration of what other approaches are available and that may be appropriate or worth consideration for application in this research. The priority, here, is that that the research design will:

> *...ensure that the research maximises the chance of realising its objectives'. Therefore, the research design must take into account the research questions, determine what data are required, and how the data are to be analysed.* (Fellows and Liu, 2008)

There are a number of different styles that might be adopted, depending on the specific needs of the research and the desired outcome and data gathered, as will be outlined below. However, there is an additional layer of understanding that is helpful to highlight when considering the style to adopt. This is described by Graziano and Raulin (1997) as 'levels of constraint' for the researcher. These levels might be viewed as being at, or operating, at a 'higher level' from different 'styles' but they do provide a greater depth of understanding as they further help to situate research and the methods that have been adopted. This is most helpful in what these authors offer as dimensions that form a 'continuum' from low to high *levels of constraint*. These levels of constraint, then, can be described as being 'the degree to which the researcher imposes limits or controls on any part of the research process' (ibid) and can be summarised as in the following table:

Table 3.1 Levels of constraint in research. Adapted from Graziano and Raulin (1997)

Naturalistic Observation	This involves the observation of subjects in their natural environment. The researcher should do nothing to limit or change the environment or behaviour of the subjects.	Low constraint ↓
Case Study Observation	This involves moving the subject into a moderately limiting environment, intervening to a slight degree, and observing the subject's responses.	
Correlational Research	Here the focus is on quantifying the degree of relationship between two variables. The measurement procedures must be carefully defined and precisely followed.	
Differential Research	Here two or more pre-existing groups of subjects are compared. The setting is usually highly constrained, and the measurement procedures must be carefully defined and precisely followed.	
Experimental Research	Identical to differential research except that the subjects are randomly or in some other way assigned without bias to the various groups or conditions in the study. This is the highest constraint level of research.	↓ High Constraint

It is clear from descriptions offered here that while not being conducted as a case study, 'Case Study Observation' is the most applicable in terms of *research constraint* and this helps situate the research being undertaken in this thesis, as it allows for the flexibility on the part of the researcher to shift attention, and its applicability to a variety of 'human issues' (ibid). It is also interesting to note that the authors do not hold the opinion that research must necessarily move from low to high constraint i.e. adopting increasingly empirical styles to become more valid. Indeed, they propose that it may often be necessary to do the opposite in order to test and explore findings.

For Bell (1993), there are five 'styles' of research: Action, Ethnographic, Surveys, Case Study and Experimental. Yin (1994) also offers five types, they are delineated as Surveys, Experiments and quasi-Experiments, Archival Analysis, Histories and Case Studies while Dainty (2007b) offers a description of six different methods, synthesised from the literature, that are relevant to *qualitative* research: Observation and Ethnography, Discourse and Conversation, Document and Textual Analysis, Visual Data, Interviews and Case Studies.

These different categories of *styles*, *methods* or *approaches* is not offered in an attempt to provide an exhaustive taxonomy, but to highlight the variety of acceptable definitions, interpretations and applications of different research *styles*. (For other examples of classifications, see Denzin and Lincoln (2000), Bryman and Bell (2003) and Cassell and Symon (2004). Just as different levels of constraint are required, as described above, different research situations and inquiries will require a different and particular style, or styles, to be utilised.

Since this research is rooted in the qualitative domain, it seems most appropriate to expand a little on the classification set offered by Dainty (2007b) summarised as follows:

Observation and Ethnography

Both Observation and Ethnography require the researcher to be involved in the research setting. This can be as a participant or as a non-participant – the former approach involves becoming part of the action, while the latter requires the researcher to become an accepted part of the scenery. Both approaches are heavily reliant on the

taking of field notes and usually necessitate a prolonged period of emersion in the research in order to gain acceptance and, as far as possible, for the observations to be naturally occurring. A key difference between Observation and Ethnography is that observation is primarily the act of observing while Ethnography also includes a research report. It should be noted that this method must be cognisant of the considerable ethical considerations that it imposes upon the researcher.

Discourse and Conversation

This method is concerned with the use of language. This can include words as spoken or written and even what is *not said* in a particular context. This method is interested in discovering the structure of language and aims to establish how the social world is constructed via discourse, including the effects that this has on others, their perceptions and personal experience of 'reality'.

Document and Textual Analysis

This method is ordinarily applied to secondary sources and is the analysis of textual data in any form and from any source that it may be obtained.

Visual Data

Similar to Textual Analysis, Visual Data is a method used to analyse images such as photographs, video and different types of pictures that may provide the researcher with some information about the context or social setting of the data.

Interviews

This method exists in a variety of forms and will be expanded upon in the following sections of this chapter. Interviews can be classified in decreasing order of constraint as structured, semi-structured or unstructured and can take place in an individual or group setting, such as a focus group or workshop. Interviews involve direct interaction with participants and are often interested in the construction of *meaning*.

Case Studies

As Dainty (2007b) comments, the Case Study is often erroneously described as a method as there is 'no single way to conduct case study research' (ibid). However, the Case Study approach is still worth consideration as a 'method' as it will usually incorporate a number of inter-reliant methods that will themselves be robust – whether qualitatively or quantitatively.

3.7 Why Interviews?

This section moves the discussion on from the broader aspects of qualitative research and descriptions of the various modes of enquiry that may be used to the specific aspects of this research project. Namely, the use of interviews as the means of obtaining not just 'data' but *knowledge*, *meaning* and a *narrative of a person's lived reality.*

As Miller and Glassner (1997) note,

> *Research cannot provide the mirror reflection of the social world that positivists strive for, but it may provide access to the meanings people attribute to their experiences and social worlds. While the interview is itself a symbolic interaction, this does not discount the possibility that knowledge of the social world beyond the interaction can be obtained. In fact, it is only in the context of non-positivistic interviews, which recognize and build on their interactive components (rather than trying to control and reduce them), that "intersubjective depth" and "deep mutual understanding" can be achieved (and, with these, the achievement of knowledge of social worlds).*

They further go on to suggest that:

> *… narratives which emerge in interview contexts are situated in social worlds; they come out of worlds that exist outside of the interview itself. We argue not only for the existence of these worlds, but also for our ability as researchers to capture elements of these worlds in our scholarship.*

These last words from Miller and Glassner (1997) are highly significant to the research presented here – the intention is to capture elements of the design and architectural practice *world*. Building upon this, and in drawing this chapter to a conclusion, the following sections will look at the specific utility of interviews in qualitative enquiry before noting some of the strengths and weakness of using interviews as a means of data collection. This is followed by consideration of some aspects of interview *interactions* about which there is found to be differing opinions in the literature, before briefly considering some of the ethical aspects of interviewing that will lead into chapter 4: *Data Collection*.

3.7.1 The Utility of the Research Interview

There is a diverse range of opinions in the literature about the type of information that can be gleaned from qualitative interviews and, as discussed in the opening sections of this chapter, a large part of this rests on the philosophical interpretation of whether the words spoken in the interview are merely a result of the social interaction taking place, as would be asserted by an 'extreme' Social Constructionist for example i.e. 'there is no knowledge about a reality that is "out there". Or, it may be that the philosophical assumptions require the conclusion that 'interviews are meaningless beyond the context in which they occur…'(ibid) Indeed, it may be held whether, and to what extent *the interpretation* of the interview account itself – including the interpretation beyond the words spoken – are a product of the social interaction taken place in the interviews. Further, and in a partial counter to this, it is expected that Miller and Glassner (ibid) would assert that the interviewees in this particular research are experiencing the *phenomenon* of 'interacting with sustainability issues' to differing degrees, but would nonetheless be experiencing them whether they were interviewed or not.

Laying aside the nuances of *interaction* for now, it is clear that *knowledge* is a desired output for the research interview and, as such, the interview provides distinct utility in the provision of knowledge. Brinkmann and Kvale, (2015) outline what they define as seven key features of Interview *knowledge* and the following is an adaptation of their description of these features*:*

> **Knowledge as Produced:**
> This points to entire process of the interview being able to produce knowledge. This begins with the social construction of knowledge as the interviewer and interviewee interact and continues through the interpretation and analysis of the interview data and is affected by the tools and techniques applied to the data. The knowledge is 'not merely found, mined or given' but is something that is produced and 'co-authored' by the participants.

Knowledge as Relational:

This type of knowledge is referred to as 'inter-relational and inter-subjective' where there is knowledge to be gleaned about the human. In short, the interviewer can simply gain knowledge from the views put forth by the interviewee or, alternatively, they can also gain knowledge about the interaction between the two participants.

Knowledge as Conversational:

Brinkmann and Kvale suggest there is a 'loss of faith in an objective reality that can be mirrored and mapped in scientific models', so therefore attention must be turned to 'discourse and negotiation about the meaning of the lived world' whereby conversations provide a means of accessing knowledge. Qualitative interviews, therefore, have the 'potential of producing descriptions and narratives of everyday experiences as well as the epistemic knowledge justified discursively in conversation'.

Knowledge as Contextual:

As is briefly touched on above, hermeneutic philosophy contends that everything in life, and the understanding of it, is contextual, whereby knowledge from one situation is not necessarily transferrable or 'commensurable' to a different situation. As such, interviews take place in a particular context and when it comes to assessing the output from a qualitative interview and any 'qualitative analytical generalisations of the knowledge produced', it must be accompanied by an appropriate contextual description.

Knowledge as Linguistic:

This refers to the pervasiveness of different aspects of *language* to interview research and is conceptually related to the 'Linguistic Turn' that was discussed above. It is via language that information is exchanged and that participants interact, and it is also different forms of language that produce the output of the interview process – either in the written form of transcriptions of oral statements. It is also important to note that oral

language and written language are different and converting one to the other is not just the process of transcription since they are different in nature and the construction of knowledge may be affected since it relies on 'linguistic interaction'

Knowledge as Narrative:

This feature of knowledge points to the power that is held in stories as a 'means of making sense of our social reality and our lives'. Interviews are an ideal means of drawing out narratives from participants that 'inform us of the human world of meanings' and, as such, the research interview provide access to this critical element to drawing upon the life and experience of the interviewee.

Knowledge as Pragmatic:

In the research landscape that currently prevails, Brinkmann and Kvale suggest that questions of whether a study is adequately 'scientific' or 'whether it leads to true knowledge' is being replaced by *pragmatic* questions as to whether research is useful. 'Good research is research that works', it is contended. Of course, what people deem as 'useful' is clearly open to interpretation, interrogation and ethical questions, however, it is also suggested that in pragmatism 'ideas and meanings derive their legitimacy from enabling us to cope with the worlds in which we find ourselves'. Hence, the ideas and meanings produced from qualitative interviews offer value in their ability to aid the navigation of the social world.

Aside from the production and gathering of knowledge, the utility of the research interview is represented in a variety of other ways. One of these is the relative simplicity and straightforward means which it provides for the collection of data and, as Have (2004) also notes: 'For most social researchers, interviewing people is the obvious, if not to say 'natural', way to collect data.' While interviews also don't need to be overly complicated, as asserted by Rapley (2004) – they are just building on things that people do every day – asking and answering questions. Taking it further, Rapley also contends that contra to 'most of the current literature on 'how to' interview,

interviewers don't need massive amounts of detailed technical (and moral) instruction on how to conduct qualitative interviews.' For Gubrium and Holstein (2002), similarly, qualitative interviewing is described as 'simple and self-evident'.

Further to this, the qualitative interview has emerged and continued to develop as a means of exploring the thoughts and perceptions of those being interviewed and, following the 'linguistic turn', as Rapley (2004) notes 'the gaze fell to the interviewee's shifting and complex, discursive, identity and narrative work'.

The qualitative interview is also seen as particularly useful, owing to what Miller and Glassner (1997) describe as the capacity they provide for the likelihood that the interviewees will tell 'collective stories' – which is deemed particularly useful in this particular research. Beyond this is also a somewhat anticipated situation for this research, described by Kleinmann *et al.* (1994) where 'Respondents may reveal feelings, beliefs and private doubts that contradict or conflict with "what everyone thinks"' Sustainability is the type of topic where, since there are so many different viewpoints held across society and industry (as was considered in Chapter 2) that a person may find themselves in a working situation where their own personal views or even convictions are not in line with their colleagues – either because they hold to a 'stronger' or weaker' view of sustainability. The interview situation offered in this research may provide the 'safe' and anonymous setting where an interviewee may feel free to voice their views without fear of creating an awkward or difficult situation that may occur if they were to do this in their regular work context, whilst amongst colleagues.

3.7.2 The Interview Society

A further feature of the utility of the research interview is an outworking of what has been dubbed the 'Interview Society' i.e. the state that society has now reached whereby interviews have become a near ubiquitous means of enquiry, as is almost bemoaned by Fontana and Frey (2005):

> *One cannot escape being interviewed; interviews are everywhere in the form of political polls, questionnaires about visits to doctors, housing applications, forms regarding social service eligibility, college applications, talk shows, news programs – the list goes on and on. The interview as a means of data gathering is no longer limited to use by social science researchers and police detectives…*

Interviews are everywhere and people now expect to see them used as a means of exploring or interrogating a topic of interest. This undoubtedly works in the favour of those undertaking research interviews as the interview is widely seen as a legitimate means of enquiry which the participant need not fear. Indeed, as Rapley (2004) highlights, people are now so familiar with the interview that 'we all just know 'at a glance' what it takes to be an interviewer or an interviewee.'

There are, of course, criticisms that are rightly directed at the notion of 'The Interview Society' and these criticisms should not be taken lightly by the researcher. One aspect of this is highlighted by Have (2004), in that:

> *…research interviewers tend to take for granted that they somehow have the 'right' to ask the questions they ask, although usually they will formulate their requests in very polite ways, accepting any answer they may get. In other words, the fact that interview-like formats are used so pervasively and in such a variety of institutional contexts, may burden the research interview with associations and felt implications that are at odds with the research interviewer's intentions and purposes.*

Meanwhile, there are dangers present concerning how robust the method may be and where the interview as a research gathering technique becomes diluted. Dainty (2007a), building on the work of both Hammersley and Gomm (2005) and Gubrium and Holstein (2002) explains this in the following terms:

> *Within the social sciences, the apparent over-reliance on interviewing has been attracting criticism from researchers who see it both as symptomatic of the 'interview society' and as belying the fact that interviews are themselves methodologically constructed social products … In the past, those critical of interviewing have questioned their efficacy based on practical and pragmatic considerations such as the truthfulness of the informant and the differences between what people say and what they actually do.*

While for Frankfurt (2005) there is an exasperation as to the over-use of interviews expressed in the notion that: 'The widespread conviction that it is the responsibility of a citizen in a democracy to have opinions about everything.' Silverman (2013), too, notes that the emergence of technology and the use of interviewing in the mass media – in contributing to the formation of 'The Interview Society' – creates situations where [interview] 'subjects who are not only happy to confess but seem to feel that their once-private emotions are somehow validated when revealed…'

These observations are duly noted in the context of this research and, indeed, must be considered to some extent when analysing and subsequently discussing the data. Further potential issues with the use of the interview will be discussed below, and these must also stand and be considered against the fact that the interview is considered to be the most appropriate and suitably robust method of gathering data for this research.

3.7.3 Noted Strengths and Weakness of the Research Interview

A number of different strengths and weakness of the research interview have been highlighted both in this chapter and also in the preceding chapter *Context and a Review of the Literature* but it will be useful, at this point to draw this together and explicitly state some of these strengths and weakness as found in the literature. To that end, the following is adapted from Greenfield (2002) as a 'snapshot' to these:

Table 3.2 Noted Strengths and Weaknesses of the Research Interview [adapted from Greenfield (2002)]

Interview Strengths	Interview Weaknesses
A face-to-face encounter	Data are open to misinterpretation
Large amounts of expansive and contextual data can be obtained quickly	Depends on the cooperation of a small number of 'key informants'
Facilitates cooperation form the research subject/interviewee	Can be difficult to replicate
Facilitates access for immediate follow-up collection for clarification and omissions	Procedures may not always be explicit
Useful for discovering complex interconnections in social relationships	Data is often subject to observer effects
Data are (should be) collected in a natural setting	Can be obtrusive and reactive
Good for obtaining data on non-verbal behaviour and communication	Can cause danger or discomfort to the researcher
Facilitates analysis, validity checks and triangulation	Depends on the honesty of the interviewees
Facilitates discovery of nuances in culture	Depends greatly on the ability of the researcher(s) to be resourceful, systematic, honest and their ability to control bias
Provides for flexibility in the formulation of hypothesis	
Provides background context for more focus on activities, behaviours and events	
Great utility for uncovering the subjective side	

While not all the strengths and weakness listed above will necessarily apply to this research project or, indeed, universally to any other research reliant on interview data. what this does help provide, in addition to what has already been discussed in this chapter, is a useful overview by which the variously applicable strength and weaknesses might be considered and weighed up against each other.
Further to this, Marvasti (2004) notes the more recent and emerging theme of *postmodernism* and how this might impact upon research interviews whereby:

> *…various questions raised by postmodernism are: How could the traditional interview model be transformed into something more liberating and empowering for the respondents? Who owns the text and the stories that emerge from an interview? Is it the researcher's story to write as he or she wishes or is it the respondents' story?*

While not considered to be of immediate concern to this research project, it is nonetheless noted, and it may, of course, become an aspect of interview-based research that becomes increasingly more relevant in the future. Although, that will depend on how that particular standpoint does or does not become prevalent and continues to evolve in line with the associated research methodological approaches to interviewing.

Clearly, as Marvasti (ibid) further notes, there is also a practical element to be employed when considering these issues and any others that may emerge where they state that 'it is important to keep in mind that your choice of interview technique should be in synch with the topic of your interest and the questions you wish to answer' and this is similarly expressed by Brinkmann and Kvale (2015) in terms of '…the best (and perhaps the only good) reason for choosing interviews is that they match the subject matter of interest'

So, even when set against the potential issues with using research interviews to gather data and the further points raised prior to this when discussing 'The Interview Society', the following are offered to underline why the interview is still considered to be particularly useful and appropriate to this research undertaking. For Miller and Glassner (1997), there is the straightforward notion held that:

> *'Those of us who aim to understand and document other's understandings choose qualitative interviewing because it provides us with a means for exploring the points of view of our research subjects, while granting these points of view the culturally honoured status of reality.'*

Meanwhile – with specific reference to how appropriate the research interview is – is the defence offered by Byrne (2004) with an onus on the researcher for the interviews to be *done well* to achieve robust outcomes:

> *Qualitative interviewing is particularly useful as a research method for accessing individuals' attitudes and values – things that cannot necessarily be observed or accommodated in a formal questionnaire. Open-ended and flexible questions are likely to get a more considered response than closed questions and therefore provide better access to interviewees' views, interpretation of events, understanding, experiences and opinions … when done well is able to achieve a level of depth and complexity that is not available to other, particularly survey-based approaches.*

3.8 Interviews – An interaction, with interaction

This penultimate section builds upon the earlier, albeit brief, discussion of the 'meaning' to be found in interviews and looks forward to the discussion of the data collection and data analysis in chapters 5 and 6 respectively.

Interaction in interviews can be understood, or conceived, of in several ways. On the one hand an interview is an example of *an interaction* or, more specifically in the context of this research, *a social interaction*. As such, Miller and Glassner (1997) propose that 'interviews have the capacity to be interactional contexts within which social worlds come to be better understood.' This aspect of research interviews has been laid out in this chapter in various guises already and the assertion made here is that the research interview is a valid and reasonable way to not only obtain information and knowledge in a practical or even technical sense, but also to begin to gain some valuable, real-world discernment of a person's reality that, when contextualised, can provide beneficial and applicable insight.

For Interpretative research, an extension of this might also be understood in the same way that Schweber (2015) describes 'the plausibility and coherence of the account' as being a means of evaluating (interpretivist) research. Similarly, as is pointed out by Gubrium and Holstein (2002) it is difficult to assert that knowledge has been tainted if there is not some acceptance that the knowledge does in fact already exist in 'some pure' form separate from the interview situation that has elicited it.

Meanwhile, Miller and Glassner (1997), in defence of the research interview as a means of gathering useful and usable data, state that:

> *…it is not the case that we are "not too sure whether interviews are purely local events or express underlying external realities," as Silverman (2001: 111) has suggested. Instead, we argue against the dualistic imperative to classify them as one or the other. All we sociologists have are stories. Some come from other people, some from us, some from our interactions with others. What matters is to understand how and where the stories are produced, which sort of stories they are, and how we can put them to honest and intelligent use in theorizing about social life.*

On the other hand, *interaction* can also be conceived of in an entirely different sense beyond that of a social encounter. This refers to the notion of – not so much *whether* – but the extent of, and how important the ongoing interaction *in* an interview is i.e. *between* the interviewer and interviewee during an interview and how this influences the data that is produced. One underlying aspect of this is what Rapley (2004) summarises as 'Interview-data-as-resource' and 'Interview-data-as-topic' whereby the former concept is described as 'the interview data collected is seen as (more or less) reflecting the interviewees' reality outside the interview' as has already been discussed in the preceding sections in this chapter and where the latter concept is described as 'the interview data collected is seen as (more or less) reflecting a reality jointly constructed by the interviewee and interviewer.' It is this second concept that has been widely visited in the literature and about which there is disparity of opinion.

The 'traditional' view of interpersonal interaction in a research interview is well captured by Holstein and Gubrium (2011) in that:

> *…the interview may be viewed as a dispassionate, passive instrument for obtaining information. Interviewers ask unbiased questions. Respondents provide pertinent answers. The interview process is merely a neutral conduit between the two. The standard version of the interview keeps the interviewer's involvement to a minimum. The interviewer should be disinterested and inconspicuous, like the proverbial fly on the wall. The cooperative and open respondent provides pertinent information.*

This is allied to the prevailing positivist and empirical approach in construction research that is so often dominant, as has been discussed in this chapter already. Fellows and Liu (2008) describe the way that this position is often framed:

> *Ideally, the researcher and the existence of the research will have no influence on the data collected…. Minimisation (of these impacts) is sought by using objective methods designed to remove as much bias as possible and to conduct the research in the most unobtrusive way, while retaining good-will of the collaborators and subjects of the study – essential in studies of people and their behaviour.*

Conversely, Rapley (2004) points out that 'Much of the more contemporary literature, irrespective of broader theoretical commitments, argues for an engaged, active or collaborative format of interviewing.' While Holstein and Gubrium (2011) also note that 'All participants in an interview are implicated in the construction of narrative reality. They are involved in narrative production, not contamination.'

While these views are welcome and, indeed Wooffitt and Widdicombe (2006) also believe that the semi-structured interview is actually in much less danger of being overly affected by either view of interaction described here since the nature of the semi-structured interview adheres 'more closely (never completely of course) to normative conventions of conversation', it is the assurances of Rapley (2004) that are most welcome:

> *'interviewers don't need to worry excessively about whether their questions and gestures are 'too leading' or not empathetic enough'; they should just get on with interacting with that specific person.'*

For Rapley, *interaction* in this sense, is not only to be expected but it is an imperative.

3.8.1 Interaction Dangers and Reflections

Nevertheless, and in full cognisance of the 'softer' aspects of interaction that have been discussed in the previous section, there are dangers present in the interview context – relating to the inadvertent leading of the interviewee and of the interviewee conforming to a particular 'type' of participant.

This first aspect is captured in what is described as *The Hawthorne Effect.* As has already been mentioned, the interviews in this research – as far as possible – are intended to operate much like an everyday conversation. This 'conversation' is, of course, led and developed by the researcher to gravitate towards the areas of specific interest to the research – partly influenced the pre-prepared scheme of questions – but also actively, by choosing which areas to pursue and respond to in reaction to what is said to them. The researcher, therefore, must continually be at pains to not unduly influence the responses of the interviewee in developing the conversation. This is not the same as the influence described above in being a part of generating the narrative

but is a much more harmful and insidious form of interaction. This can, of course, occur inadvertently but nonetheless must be guarded against. If steps are not taken to prevent overly influencing the participants' responses – a situational danger that has been reflected on in previous sections this can lead to the development of the 'Hawthorne' or 'observer' effect whereby the respondent, in different ways, may alter or conform their answers under this influence (for an example of how this can be mitigated see Oswald *et al.* (2014)).This was felt to be particularly relevant *in this research* owing to the topic of sustainability being discussed, as there might be an inclination on the part of the participant to provide what they thought to be 'model' or 'good' answers and thereby – deliberately or not – potentially engaging in 'virtue signalling' in an attempt to demonstrate their own sustainability credentials.

In addition to this and, while not in specific reference to the Hawthorne effect, per se, Rapley (2004) also points out the danger that exists where the interviewee is 'producing themselves as an "*adequate interviewee*", as a "*specific type for person in relation to this specific topic*" ' – which can then result in the interview being more of a representative of the social encounter that has taken place than the topic being discussed.

Seidman (2006), however, offers some straightforward advice for limiting the impact or potential of this type of influence to creep into the interviews and which can be easily applied. Firstly, is the imperative to 'Only share experiences occasionally' and secondly is to 'Avoid reinforcing your participants' responses'

Lastly in this section is the simple advice offered by Rapley (2004) when it comes down to the analysis of the interview, in the form of an exhortation: '*Don't rip the words out of context*'. And, of course, this straightforward exhortation is of particular application for this research when it comes to the discussion of the data in Chapter 6.When considering these different types of interaction that are described above, and reflecting on how these were encountered in practice several elements stand out.
First is that during the during the initial interviews the latent ability that exists to influence the contributions of the participant became acutely apparent. During the second interview that was conducted, previous employment that I (the interviewer)

was engaged in was mentioned in passing and that during the course of that interview that employer became a focal point for examples given by the participant on several occasions. While this did not have a detrimental effect on the interview or, indeed, the information that was gleaned from the interview, it did provide sufficient, tangible, evidence of how the innocuous provision of (personal) information can have a real effect on the answer of interview participants. With this experience, greater care was taken, when appropriate, in the remaining interviews to steer discussion around information that might have similar effects, although it was not an overriding concern. Similarly, there were instances of participants attempting to demonstrate 'adequacy' as has been described from the literature, above, too and when observed it was deliberately not indulged or reinforced in order to maintain the natural element of the social encounter as far as possible.

3.9 Research Ethics

Finally, in this chapter, is a brief discussion around the ethical concerns that must be addressed when conducting research, some of which will be further discussed in Chapter 4: *Data Collection*. Even although there may be the temptation to dismiss ethical issues because the researcher doesn't think they have any to worry about, they still must be considered carefully. This is especially true as Greenfield (2002) cautions: '…no matter how good a person you are and how well intentioned , there is the possibility, indeed it is very likely, that you will be inadvertently unethical…' and further to this, Greenfield cites an early iteration of the widely respected *Declaration of Helsinki, which* offers an invaluable application to all types of research, in that 'It is unethical to conduct research which is badly planned or badly executed' (ibid).

As far as ethical issues relating to interview-based research, specifically, Brinkmann and Kvale (2015) offer a very useful and concise overview of the ethical considerations at seven identified research stages:

Table 3.3. Ethical Issues at Seven Research Stages (adapted from Brinkmann and Kvale (2015))

Stage	Ethical Issues
Thematising	The purpose of the study should be considered with regard to the human situation investigated.
Designing	Informed consent should be sought from the participant – securing confidentiality and considering the possible consequences of the study for the subjects.
Interview Situation	The personal consequences of the interview interaction for the subjects needs to be considered, such as stress in the interview and changes in self-understanding.
Transcription	Protecting the confidentiality of the interviewees and ensuring that transcribed text is true to the interviewee's oral statements.
Analysis	Considering the question of how penetrating the analysis of the interview can be and whether the subjects should have a say in how their statements are interpreted.
Verification	It is the duty of the researcher to report knowledge that is as secured and verified as possible. This involves the issue of how critically an interviewee may questioned.
Reporting	Ensuring confidentiality when reporting private interviews in public and the consequences of the published report for the interviewees and for the groups that they belong to.

While the research stages identified above may not be strictly laid out as distinct stages in this research. However, the function of each is, nonetheless, being fulfilled during the course of the research and, hence, the applicability of the ethical issues that are identified are equally applicable.

Although implicit in table 3.3 above, it is worth specifically mentioning *anonymity*, identified by both Barbour (2008) and Fellows and Liu (2008) who helpfully provide the reminder that information pertaining to the person is covered by *anonymity* whereas *confidentiality* is in relation to the data.

Finally, are the legal implications for the gathering and holding of research interview data. This has previously been protected by applicable Data Protection provisions in UK law and is now superseded by the General Data Protection Regulations (GDPR) which apply whenever personally identifiable information is collected and held – and this

applies, too, for academic research. GDPR will be visited again in Chapter 4: *Data Collection* but it is worth noting that UK Research and Innovation (UKRI) provide comprehensive guidance[56] relating to GDPR and academic research and, in addition to this the following guidance is provided by The University of Edinburgh:[57]

Undertaking research in an ethical, fair and lawful manner complies with the requirements for data protection legislation and must start prior to project approval by incorporating data protection and privacy into the research planning process.

Clearly, then, in addition to the ethical issues outlined here, Data Protection provisions do pose additional implications for this research since personally identifiable information is being held – even with anonymity – in the contents of the transcribed interviews and details relating to participant's work situation and personal life which may be provided anecdotally in the course of an interview. In line with these Data Protection implications, it should also be noted here that all the data from this research will be held after the research is complete in line with the stated retention policy and provisions of the University of Edinburgh.

3.10 Chapter 3 Summary

In this chapter, a variety of aspects surrounding the philosophy, methodology and methods for this research have been considered. First, the research was situated in the domain of 'construction management research' and the appropriate theoretical philosophical approaches were discussed, including the broad positioning of the research within the interpretivist paradigm, but, specifically, after due consideration the application of a *critical realism* ontology and *interpretivist* epistemology. Following this, there was a discussion around the difficulties of pin-pointing the typology of research in this domain and reasons it is difficult to find a 'perfect fit'.

Then, there was consideration of the *methods* that will be used in this research with a view to begin to interpret the data for *meaning* and the most approach research *style*

[56] UK Research and Innovation GDPR guidance document: https://www.ukri.org/files/about/policy/ukri-gdpr-faqs-pdf/ (accessed 15 May 2019)
[57] The University of Edinburgh Research and the General Data Protection Regulation advice page: https://www.ed ac.uk/records-management/guidance/research/data-protection (accessed 15 May 2019)

for this. This was followed by a look at the *interview* method specifically, since this is the chosen method for this research and included a look at the strengths and weaknesses of interviews and a particular focus on the discourse surrounding different aspects of *interaction* with interview-based research. Finally, some consideration was given of the ethical considerations for this research project, which along with further aspects of the research methods considered here, will also be further discussed in following chapter: *Data collection.*

CHAPTER FOUR

DATA COLLECTION

'Do not look at the faces in the illustrated papers. Look at the faces in the street.'

G.K. Chesterton (1907)

4.1 Introduction

This chapter will describe the specific data collection steps and methods that were used to gather the data that this research is based on. This will include an overview of the type of data gathered, who it was gathered from and how it was gathered. This will be accompanied by advice for successfully gathering consistent data and also notes of caution found in the literature about the data collection methods that have been employed. Lastly, some reflection on the data collection process will be offered, including where difficulties were encountered and to what extent there may have been opportunities to improve upon the data collection process.

As has already been discussed in Chapter 3: *Methods and Methodology*, the data that this research relies on was gathered through semi-structured interviews, with participants that predominantly consisted of practicing architects. These 'data', gathered via the interviewing of participants is the Primary Data and consists of the written transcripts form the interviews and accompanying notes or 'field notes' which will be briefly be discussed again in later sections of this chapter, having already been explained more fully in Chapter 3. There are no formal Secondary Data sources in this research that have undergone analysis, although it should be noted that there are a number of key document sources relevant to the broader context of this this study and for the provision of critical insight for the Data Analysis process which will be discussed in Chapter 5.

4.2 Primary Data: Semi-Structured Interviews

Twenty-one individuals have been interviewed in the course of this research. Each person was interviewed on their own and, while the intention was for each interview to last around 45 minutes, the length of each interview did vary in time substantially. This ranged from around 30 minutes in the case of the shortest interview to in excess of 1 hour and 30 minutes for the longest interview.

The setting for each interview was, likewise, varied. Sometimes the setting was a noisy, active environment such as the three that took place in coffee shop locations; this did pose additional difficulties for the fluidity of the interview although, fortuitously, this did little to diminish the engagement of the interviewees on those occasions. Mostly,

the setting was quiet and undisturbed. The vast majority of the interviews were conducted in an office, meeting room or company breakout space in the interviewee's work location, but two interviews took place in an unoccupied staff kitchen/canteen area and one even took place in the interviewee's own kitchen in their home, which made for a particularly quiet and focussed setting.

All the interviews took place during working hours and on each occasion, there was a particular effort made to ensure that the participants were as comfortable as possible in the interview environment that was set i.e. ensuring that they were allowed as much freedom as practicable to suggest an interview location that suited them well. Similarly, effort was also made to ensure that the participants had as little 'hassle' as possible on the timing and dates of the interviews and that the timing of the interview was fitted around theirs as much as was possible.

This flexibility in the interview approach did help ensure that there was a high level of engagement from participants once they had committed to take part and it is also felt that this contributed to a lowering of what might be called an 'harassment factor' on their part, inasmuch that on very few occasions did a participant express any level of discomfort at the interview getting in the way of their schedule or was making their own working day more difficult beyond possibly having a certain time to finish as they were due to attend another appointment or meeting. Of course, this may simply be a feature of the adopted approach or the personality of an individual that was willing to take part in a research interview of this nature, but it is not considered to be of any particular significance, as there was a demonstrable variety of 'personality' across the participants.

Under different circumstances, this approach may not lend itself all that well if, for example, there was a requirement for high participation numbers – as might be found in other research settings and disciplines. For several *potential* participants, it was either not possible to get the person to commit to an interview at all or unfortunately, as in some cases, to successfully coordinate diaries. On balance, and in consideration of the amount of data that was successfully gathered, it is felt that the chosen approach resulted in an outcome that was desired. Most participants were comfortable with their

participation and this is important to successful interview outcomes since, as Rapley (2004) reflects 'Put simply, if the interviewee feels comfortable, they will find it easier to talk to you.' This being set against an alternative approach that may have resulted in a larger participant pool but included participants who may have felt they had been harangued to take part and, consequently, may have engaged less effectively.

4.2.1 Recruitment and Recruitment Criteria

The recruiting of interviewees was achieved via a variety of sources including existing contacts known to the researcher and, in many cases, the contact networks, personal relationships and recommendations of the participants themselves. All potential participants were emailed to ascertain their willingness to contribute and this was followed up with a further, formal, explanatory email which was also used to distribute an information letter containing further details about the project, what to expect for the format of the interview and an 'informed Consent' checklist that will be discussed further below. In some cases, as appropriate, the prospective interviewees were also telephoned to aide communication and discussion around some of the finer points of arranging the details of the interview or where some clarification may have been needed and a discussion was most appropriate to provide the required information.

From the outset, the participant recruitment criteria used was intended to result in the inclusion of as many architects as possible amongst a group of around 20 interviewees. This number of 20 participants was arrived at for several reasons. First, was following a reflection on the discussion and requirements of data *saturation* provided by Fusch and Ness (2015) who note that *rich* data is better that *thick* data, but that it's better to have both. Second, is the advice provided by and Warren (2002) who suggest between 20 and 30 interviews is usually sufficient and Kvale (1996) who suggest that 15+/- 10 interviews is suitable 'due to factors of time, resources and the law of diminishing returns' (ibid). In addition to this, the realism offered by Bernard (2012) that a researcher 'takes' what he can get' was also taken as an encouragement that if 20 participants were successfully recruited, that would provide the basis for a successful study.

It was decided that the definition of 'architect' would not be unduly rigid and would also permissibly include those described by Murtagh *et al.* (2016) as 'architectural designers'. That is, 'professionals involved in design for construction, including engineers as well as architects.' (ibid). This was to allow for flexibility to counter any potentially unknown recruitment difficulties, but also to allow for the voices of others involved in the design processes to be heard if potential participants emerged that would fit under this broadened 'designer' definition. As will be outlined further below in section 4.2.7, the interviewees did ultimately mostly include architects or architects in training, along with one structural engineer and one architectural technologist. Beyond this, the following criteria were applied to the recruitment process: 1) The requirement to be currently working in the industry, at least in a part-time capacity, which allowed for one participant who worked in a part-time capacity as they were approaching retirement and 2) The requirement to have worked, in some capacity, on residential projects in Scotland in their recent work history. There were no stipulations applied as to whether a participants' current workload was predominantly on residential projects, although this was usually discussed as part of the recruitment process to ensure that no participants were included who only have tenuous links to recent residential projects in Scotland. Ultimately, of course, it would not have been beneficial to the research to include such participants in any case, but there was a need to establish such details before committing to an interview with a (potentially keen) prospective interviewee and, thus, avoid wasting the time of both parties. Further to this, there was no emphasis on recruiting sustainability 'experts' in any firm or, indeed, to draw participants from any firm that specifically marketed itself as sustainability specialists or being accredited to any standards that are currently in operation across the industry.

At this point it is worth providing some further explanatory context to the boundaries that have been set for the recruitment of participants to this research. As has already been highlighted above, the number of participants was intended to be capped in the region of 15+/- 10, but further to this it is acknowledged that there may be criticisms levelled at the recruitment in relation to a perceived lack of breadth in participants, from whom further depth of insight could be sought.

While it is certainly acknowledged that a broader range of participants would have brough a broader range of views with it, it is felt that this would been likely to have had a negative effect too. On careful consideration of participation criteria at the outset of the research, it was determined that its primary aim should be to reach data saturation with a cohort of *designers* and it is contended, here, that this has been achieved. To reach that point with a broader range of participants would have required a substantially larger number of interviews and, it is felt, would have increased the complexity of the analysis beyond what is necessary – especially when compared with the richness of data that was achieved with the more constrained set of participant criteria that was set.

Similarly, there was a decision to not pursue to use of focus groups in this research. Again, it is felt that this may have diluted quality of data achieved and would have required an analytical approach that may have been beyond the skill and resources available to the researcher. With this in mind, however, it would certainly be a worthwhile approach for further research, beyond what is laid out here and, indeed, receives further consideration in Chapter 7 *Conclusions*.

4.2.2 Recruitment Particulars

Rubin and Rubin (1995) outline four issues that, in their consideration, should be addressed in the recruitment process:

1. Finding knowledgeable informants
2. Obtaining a range of views
3. Testing emerging themes with new interviewees
4. Choosing interviewees to extend results

As Rapley (2004) notes, though, while these are certainly 'valuable ideals' for interview recruitment, it is not always so simple or straightforward to achieve these in reality.

For the data collection element of this research to be successful, there was certainly a need to fulfil the first and second criteria that Rubin and Rubin lay down. Although the depth of knowledge that each participant may possess is almost always unknown until

the interview takes place, this can be informally assessed, to some degree, as part of the recruitment process. In doing so, and with respect to the interviewees invariably being highly educated in a very specific professional field, it was anticipated that all participants would be adequately knowledgeable in their field to fulfil these criteria.

Likewise, and although the cohort of participants were from a deliberately (almost) homogenous subject group i.e. architects or 'designers', obtaining a range of views from participants was both desired and anticipated. By design, recruitment was directed at different geographical locations in Scotland, and also from architectural practices with both rural and urban client bases, in the expectation that this would also deliver additional diversity of views.

As has been described in Chapter 3, and will be touched on again below, the design of the semi-structured interview – to some degree – necessitates that the interviewees are essentially faced with the same set of questions. There is a degree of flexibility within this, so, in the course of the interviews there were some issues that came up that offered the opportunity to be more deeply explored with some participants and then potentially became an additional line of questioning in subsequent interviews. Making allowances for this to occur did enable some topics to be discussed a little more than they may have been intended at the outset of the interviews, but it was not an aspect that could be designed into the interview approach due to the 'organic' nature of whether a new theme emerged or not and this, ultimately, resides in the realm of chance and opportunism on the part of the interviewer.

With reference to the fourth issue noted above, this is the area that would be considered most difficult to design in, or plan into the research design. Indeed, it would have to be considered to be something of a luxury to be able to address this particular issue and enable the extension of results. While it is undoubtedly possible to identify desirable interview subjects – and this was done in the recruitment process for this research – it is an entirely different matter to successfully recruit such individuals, and the experience of this research would certainly support the reality of this.

As has been noted above, it is not always possible to fulfil the higher hopes of success that may exist at the outset of the recruitment process. That is not to say that great effort should not be expended to secure an interview with very specific individuals or for recruitment to be tied to a tight set of criteria. It is prudent to be prepared for limited success in this area, should that happen, and also with respect to addressing the four that have been outlined above. It is also important to note that as qualitative research, and almost regardless of these difficulties that may be faced, the data obtained will still be able to be analysed, and valuable meaning extracted, from which a useful contribution to knowledge may be made.

Finally, when considering the recruitment process as a whole and the reflections that can be made, including some of the issues noted here, relative levels of success that were achieved in the recruiting of participants for this research should also be mentioned.

4.2.3 Recruitment Issues and Reflections

One feature, that has already been alluded to, was the recurring difficulties encountered in formally securing interviews. Once a prospective participant had engaged with the recruitment process there was usually no marked difficulty in persuading people to take part *per se,* but real difficulty did seem to lie in securing any kind of response at all from many potential interviewees. Once acknowledged and a reply had been received, it was often straightforward to proceed from there and, as far as possible, to allow the participant to be accommodated in the specifics of arranging the interview, as is described above. For some contacts it was considered appropriate to follow up an initial email with a phone call, and for contacts with whom there was an existing relationship or where an existing contact had made the initial (and sometimes speculative) contact with other(s) on my behalf, there was less of a barrier to communication and, certainly, much less of a sense of awkwardness to these 'follow up' attempts at contact. On some occasions, the potential participant had simply forgotten, or had been too busy reply even although they were in fact happy or even keen to take part. In such cases, the follow up contact was gladly received, and arrangements could then proceed. Similarly, some potential participants expressed keen interest to take

part[58] but either became unavailable, were too busy or, ultimately, did not engage with attempts to make arrangements for an interview. Somewhat ironically, one potential participant took a great deal of effort to help arrange contact with several other people who did take part in the research, but in the end they were not interviewed themselves due to difficulties in coordinating a meeting and then becoming unavailable due to her own maternity leave. Nevertheless, in several cases there was simply no reply received at all – despite several attempts in some cases – where it was deemed appropriate to do so. There were in excess of sixty potential participants contacted directly to take part in this research and it is estimated that around a third of people who were contacted fall into this non-responder' category.

One final reflection that should be noted on the recruitment process is the relative ease by which more senior architects were able to be recruited. That is, architects who were partners, directors or holding senior positions at well-established and large practices rather than merely architects who have been qualified for a long time. This was noticed early in the recruitment process and recruitment efforts thereafter were made to ensure that the group of participants was not skewed by a number of senior practitioners that would make the group less representative than it might otherwise have been. An overview of participants is provided in section 4.2.7 below, which confirms the variety of different levels of experience and seniority across the participants. There are several reasons that could be speculated as to why it was a little easier to not only recruit, but also to arrange the interview with participants who held more senior positions. In retrospect, it would appear that these participants were able to hold a little more control over their work diary and potentially had fewer of the type of deadline pressures that appeared to be a feature of the workload of other members of the interviewee group.

There is, of course, a danger that by holding more senior positions, that these participants spend more of their time being a manager than being an architect but, again, this was gauged in the recruitment process and any prospective participants who

[58] One such example that stands out was when a prospective participant expressed clear interest in being interviewed and was even instructed by their boss (who was interviewed) to take part in the research but an interview was ultimately not secured as he stopped replying to attempts to make firm arrangements.

may have fallen into the former category were not further pursued to take part. It should be noted, too, that even where seniority did carry increased management responsibility over and above any work at the 'coal face' of architectural practice, this seniority could only feasibly have been achieved by a substantial amount of time in practice in which a great deal of knowledge and experience will have been gathered that would more than qualify such participants to take part in this research.

4.3 The Questions

In each interview the order, phrasing and framing of each 'prompting' or starter question was as similar as possible and practicable, so far as the flow of conversation allowed.

Further reflection on the research questions is offered below, but prior to that, the following section outlines aspects around the formation of the questions before a reproduction of the 'crib' sheet that was used for each interview. As a semi-structured interview, there does need to be a fairly high degree of similarity between each interview to ensure that effective comparison and analysis can be made. This needs to happen while still allowing some freedom for tangential, or a certain amount digressive conversation to occur and the underlying rationale for this has already been covered in more depth in Chapter 3. The use of the crib sheet helps to maintain the structure and flow of the interview – albeit loosely at times – while also helping to definitively ensure that as many of, if not all the questions are discussed by the end of each interview.

The crib sheet format is based on what Brinkman and Kvale (2015) describe as a 'guide' or 'script' (ibid) for an interview and is arranged along themes with associated questions under each theme. Some questions were designed to be direct, while others were indirect or similar to 'funnel-shaped' interview questions (ibid), where various topics or sub-topics – in this case around sustainability and the Scottish Building Standards – can be explored via a series of indirect questions.
Further to this, Brinkmann and Kvale (ibid) also suggest that interview questions can be broadly assessed along the following lines:

> *An interview question can be evaluated with respect to both a thematic and a dynamic dimension: thematically with regard to producing knowledge and dynamically with regard to the interpersonal relationship in the interview. A good interview question should contribute thematically to knowledge production and dynamically to promoting a good interview interaction.*

This is important because although the specific interview questions outlined here are based on the needs of this particular research, and the ultimate requirement to meet its aims and objectives, it is important that the questions are framed and pitched in the most effective manner possible. This is to ensure that it results in a comfortable interaction where ideas, perspectives and knowledge are freely expressed rather than a perfunctory, bland or awkward interaction which would be unsatisfactory for all parties concerned, and which all interviews are in danger of becoming if the questions and tone are not approached thoughtfully.

This is further exemplified by Crang and Cook (2007) and closely represents the approach that was intentionally adopted for the interviews in this research:

> *Your questions will usually need to be of a non-threatening kind, then, and the standard approach is to begin by employing so-called 'grand-tour' questions (Spradley 1979). These ask the interviewee to out-line the general characteristics of the place and/or social networks which she/he is involved in and which you intend to research. Through asking simple 'what?', 'who?', 'where?' and 'how?' questions about what you're interested in, the basic grounds for your conversation can be established.*

By describing how best to frame the early questions of an interview and develop this into a successful interaction, Crang and Crook (2007) provide a very straightforward approach to framing the questions here and this has proved to be particularly useful in this research.

4.3.1 The Interview 'Crib' Sheet

Introduce myself.
Remind interview of the aim of the project is and re-iterate confidential nature and their own freedom to say whatever they like.

Opening Questions

Name:
Role:
Training / Education / Qualifications:
Level of experience:

Experience or proportion of work that is residential / domestic as opposed to commercial?

Short overview of your company / working situation?

_ _ _ _ _ _

Begin with Open Questions, then follow with these:

1. The project process - start to completion steps:

- *Where does sustainability come into it?*
- *Who initiates it?*
- *Who or what drives it? Formal or informal?*
- *How much influence do you feel you have?*
- *Examples?*

2. Definitions:

- *What do you define sustainability as [for the Construction Industry]?*
- *What defines sustainability in your work?*
- *How do you find the understanding levels of fellow professionals and the trades around sustainability issues?*
- *What do you consider the importance levels around sustainability to be - for you and others?*
- *Do you ever have to define 'sustainability' for clients (examples?)*
- *Is there a different or working definition of sustainability that you adopt [particularly thinking of interactions with clients or other professionals/trades]?*
- *Do you personally feel educated / 'literate' in sustainability issues?*
- *Where does this knowledge / CPD come from?*
- *Does the 'Industry' make it easy for you to remain informed?*

3. 'Classic' definitions:

- *What is your familiarity with the concept of 'sustainability' as a 'balance' of social/ environmental/ economic spheres?*
- *How applicable is this for you as an [architect]?*
- *Is it a balance for you? Do you feel it is the right balance?*
- *Do you feel you have the ability to influence each of these aspects?*

4. Building Standards, Regulations ('Section 7' - Sustainability)

- *How effective do you think the Building Standards are to deliver their stated aims?*
- *Do you think the Building Standards are a promoter or barrier to sustainability?*
- *Has the fairly recent introduction of Section 7, in particular, altered your perception of sustainability?*
- *Higher levels of achievement - Silver Gold, Platinum*
    - *Are these useful?*
    - *Are they understandable?*
    - *Have you sought to achieve them? Do you know anybody who has?*

Final Question

- *What do you understand by 'furthering the achievement of sustainable development' [Climate Change Act 2009]?*

4.3.2 Piloting

Building upon the guidance outlined above, the final aspect to discuss before moving on is the utility and necessity of piloting the research questions prior to undertaking the interviews formally. Fellows and Liu (2008) offer the following advice in relation to the piloting stage of research, using a small and suitable sample – specifically offered in the context of questionnaires – although considered, here, to be equally relevant to interview based research:

> *The piloting will test whether the questions are intelligible, easy to answer, unambiguous etc., and, through obtaining feedback from these respondents, there will be an opportunity for improving… Discussion… with the supervisor and other researchers is a useful supplement to piloting, as it provides a research-oriented view of the questions… An important aspect of piloting, which is overlooked all too often, is whether the data yielded by the questionnaire (or other data collection instrument) is suitable for analysis (as intended) and, via the analysis, is adequate to give results which facilitate valid testing of hypothesis and realising the objectives – i.e. can the research question(s) be answered?*

In line with this advice and, while it was judged that there was no specific need for an extensive or potentially unwieldy piloting exercise for this research, the questions were piloted with a small sample of persons not associated with the research. Via this, and under the guidance of the research supervisor, the interview questions were critiqued and refined to ensure their intelligibility, applicability and suitability for the subsequent analysis process. Of course, with the hindsight available after completing the interviews there were further changes and improvements that could undoubtedly have been made and some of these are reflected upon in the proceeding sections. With reference to the necessity of, and the steps undertaken, to pilot these questions prior to the interviews – the approach taken was considered to be sufficiently robust and an invaluable precursor to the interviews.

4.3.3 'Computer Assistance'

There are several aspects referenced in the literature that can be broadly grouped under the term 'computer assistance' and they will be considered here briefly. The advent of ever improving technology has undoubtedly made its impact known in qualitative research and particularly in the realm of data collection. Telephone, email, electronic surveys, instant messaging, online chat forums and video calling are just some examples of legitimate methods, or modes, of collecting data that would have

been considered permissible in this research such, but were not considered to be the most effective means of conducting data collection for this project. There are certainly advantages that might be gained by embracing these different modes, including an increase in the speed and volume of data that may be collected. There may be the added benefit, too, of the collection being 'self-transcribing' and almost immediately ready for analysis as highlighted by Brinkmann and Kvale (2015) However, in doing so, there is certainly much to be lost, too, notwithstanding the need for a fairly high level of written communication to be held by both parties (ibid) in many of these 'computer assisted' modes for them to be effective. Most importantly, there are nuanced interactions that can only be achieved by interviewing somebody face-to-face, rather than at distance, where the full benefits of interaction as described in Chapter 3 may be realised, while it can also 'be difficult to generate rich and detailed descriptions'[59] (ibid) and, by extension, the ability to access and interact with the meaning underlying the interview data that has been gathered.

A second use of what might be termed 'computer assistance' is the use of a recording device to capture the audio of the interview. While there are some disadvantages if research analysis was dependent on audio recordings alone, i.e. there were no accompanying notes, inferences taken or non-verbal cues taken into the analysis process, there are also numerous advantages to be gained (not least for the transcription process, which will be discussed further below) by recording the audio and the following are offered by Crang and Crook (2007) in this regard:

[59] Brinkmann and Kvale quote a secondary reference here (Elmholdt, 2006), but the original is in Danish and not available in English.

- *constantly scribbling down phrases and other notes can be very distracting both for the interviewer and interviewee and may disrupt what could otherwise proceed as a fairly normal conversation,*

- *the researcher's memory, even straight after such a conversation, is unlikely to be good enough to remember the intricacies not only of what was said but of how it was said, and comparing notes taken afterwards with actual transcripts often reveal important differences between what the researcher remembers being said and what was actually said (particularly if you are not interviewing someone in your and/or their first language) and*

- *many researchers find it mentally exhausting to listen very closely to everything that their interviewees say, so it can often be a relief to know that if your attention wavers you can still listen to the recordings at a later date.*

Thus, by recording the audio of an interview, there is a wholly accurate record of the interview that can be interrogated if ever the need arises and there is the ability to produce highly accurate transcriptions of the encounter. Further to this, by recording the interview, it leaves the interviewer more free to be a full participant in the interview, not burdened with verbatim note taking, which leaves for more thoughtful, natural involvement in the interview and allowing for further opportunity to be reflective and to begin forming a robust impression of the encounter and the underlying meaning and rationale of what is being offered by the interviewee.

This does not mean that notes should not be taken during an interview or, indeed, that notes are not helpful. In each interview, 'field notes' are taken, and they may be indifferent forms for different purposes. They are often more observational – taking note of key phrases and words used by the interviewee but also intended to jog memory at a later date, record the immediate thoughts and impressions that the interviewer may be having and, crucially at this early stage, to begin the process of analysis by beginning to form the themes that are emerging from these conversations. Field notes are also complimentary to the transcription process which follows and may retain valuable information that will sit alongside or annotate the transcription, depending on the form and detail of the transcription.

The approach taken in this research was to record the audio of all the interviews and accompany these recording with field notes, as required. In line with what has been laid out here, this was influenced by the desire to reduce the distraction and interruption as far as possible to allow for a more natural interaction which is felt to have resulted in a very successful interview process although the importance of the supplementary field notes is certainly noted to have provided additional reflective insight after the fact.

A third way in which 'computer assistance' is utilised in research such as this is by using computers, and dedicated software in particular, to enhance the coding (or categorisation) and analysis of the data contained in the interview transcripts or any other audio, video or textual source that a researcher may want to investigate in this way. In this research, it is the primary data obtained from the interviews that is being coded and analysed thematically using the software programme NVivo, as will be discussed in Chapter 5: *Research Analysis* The process of coding and thematically analysing data in this way pre-dates the use of computers, however it is important to note that the 'computer assistance' element of this process is now an indispensable part of this process. The process of transcription, coding and analysing the primary data will be discussed again in the following chapter *Data Analysis*, including some of the reasons that have been put forward as to where and why it may not be the more appropriate way to analyse data of this type.

4.4 Conducting the Interviews

The following section outlines various aspects related to how the interviews were conducted, including an overview of who took part, the information they were provided with and some reflections – specifically surrounding the data collection that it is pertinent to make at this point – some of which has been alluded to already and some of which will be further explored in the following chapters.

4.4.1 The Participants

The majority of interviewees – 18 – were chartered architects. Aside from these, one interviewee was a very experienced (deemed as more than 20 years) Architectural Technologist and two participants were undertaking 'Part 3' training and approaching chartership. Professionally, the breakdown of experience is: three 'early career' (deemed as less than five years' experience); 12 'early mid-career' (deemed as five to

20 years' experience); six 'late mid-career' (deemed as having more than 20 years' experience) and one 'late-career' (deemed as being within five years of retirement). As has been outlined and explained in Chapter 1: *Introduction* and Chapter 2: *Context and a Review of the Literature*, this research has been carried out in Scotland and has only gathered information from practitioners currently working in Scotland who also have experience of residential projects. Again, this has been done, in part, to reduce a factor of complexity in the findings, since Scotland operates under different Building Standards compared to the rest of the UK. While the Scottish Standards are demonstrably more ambitious that the current Building Regulations applied elsewhere in the UK, the findings from this research and, indeed, the information and insight provided by the participants of this research are considered to be equally important across the Industry and the whole of the UK . This is not least because several interviewees indicated that they had worked under both systems and were asked to draw up on the entirety of their knowledge and experiences in their responses. Similarly, every interviewee did have experience in both the Commercial and Domestic sectors and, while asked to reflect primarily upon the domestic projects, they were free to draw upon the breadth of their professional experience.

The participants were drawn from a variety of types of architectural practice, each of which had a different 'typical' domestic workload split across rural and urban locations and including, but not limited to a workbook that now or has previously included single dwelling projects, larger scale housing development, Housing Association dwellings, Local Authority dwellings, 'sustainable' building projects, demonstration dwellings and some involvement in 'mass' or 'volume' house building. Although some participants did have experience of working with clients on dwellings with elevated sustainability 'credentials' or aspirations, no participants were from firms that marketed themselves as being sustainability specialists and no participants were accredited in sustainability by the RIAS (The Royal Incorporation of Architects Scotland), It should be noted that there are currently only 36 architects on this RIAS accreditation list[60] so an architect who is on the list may not necessarily be considered to be representative of a 'typical' architect currently working in Scotland in any case.

[60] The RIAS accreditation list can be found at:
https://www.rias.org.uk/for-the-public/sustainability (accessed 14 May 2019)

4.5 Engagement Protocol and 'Informed Consent'

Prior to engaging with each interviewee formally, participants were issued with a short information and cover letter along with an 'informed consent' checklist that they were required to complete and sign prior to the interview taking place. These were usually signed and returned immediately before the interviews but in some cases were returned well in advance of the interview date.

As has already been discussed in the previous chapter *Methods and Methodology* under the section entitled 'Research Ethics', informed consent is a crucial issue relating to the research design stage. The purposes of 'informed consent' are laid out by Brinkmann and Kvale (2015) as follows:

> *Informed consent entails informing the research participants about the overall purpose of the investigation and the main features of the design, as well as of any possible risks and benefits from participation in the research project. Informed consent further involved obtaining the voluntary participation of the people involved and informing of them of their right to withdraw from the study at any time… Through briefing and debriefing, the participants should be informed about the purpose and procedures of the research project. This should include information about confidentiality and who will have access to the interview or other material…*

In line with this, the engagement letter and 'informed consent' checklist are designed to provide the participant with the assurances that they need to take part, knowing that the information they provide will be handled and stored appropriately and in the confidence that will ensure that as a participant they will suffer no reprisals. The letter and informed consent form used in this research can be found in Appendix A.

4.6 GDPR

Since the Data Collection component of this research was conducted, there has been a significant change in international law that may have had consequences for how the 'informed consent' information was presented, and consent obtained. The EU General Data Protection Regulation[61] (GDPR) came into effect in May 2018 and, in broad terms, require that personal identifiable data of EU citizens is processed under certain

[61] More information can be found at the UK Information Commissioner's Office available here: https://ico.org.uk/for-organisations/guide-to-data-protection/guide-to-the-general-data-protection-regulation-gdpr/ (accessed 30 July 2019)

conditions and with the consent of the individual concerned. In academic research such as this, conducted under the auspices of an applicable organisation – in this case the University of Edinburgh – this new regulation applies. In reality, GDPR is an enhancement of pre-existing Data Protection provisions under law and since consent was obtained for each participant, incorporating information of how the data would be processed, the introduction of the GDPR it is not considered to be problematic for the Data Analysis conducted for this research.

4.7 Interim Reflections on the Interview Approach

While there will be considerably more opportunity for reflection on some of the issues raised in this chapter in the following chapters – Chapter 5: *Data Analysis* and Chapter 6: *Discussion* – there are some reflections that are worthwhile making at this point in

The first is a reflection on three of the questions used in the interviews that, in retrospect, may have been posed in a different form or manner. That is not to say that the questions should not have been posed. They certainly should still have been included, but what was not picked up in piloting the questions was how cumbersome these questions often became to ask i.e. the supplementary clarification or context that needed to be provided oftentimes detracted from the effectiveness of what the questions was seeking to explore.

This was recognised in one of the questions usually posed in the early stages of the interview:

> *How do you find the understanding levels of fellow professionals and the trades around sustainability issues?*

As the interviews progressed attempts were made to pose this question in alternative ways and with different supplementary commentary, and this was met with some success. Again, this is also not to suggest that this question was, ultimately, not clearly understood. The responses do not suggest that was the case, but the posing of the question invariably did feel convoluted to pose.

A second question that introduced similar difficulties in posing succinctly and exploring effectively in the portion of discussion that ensued was usually came up about mid-way through each interview:

> *What is your familiarity with the concept of 'sustainability' as a 'balance' of social/ environmental/ economic spheres?*

The introduction of this question often required additional explaining in some interviews. Some of the need for this can undoubtedly be attribute to a lack of understanding and even ignorance on the part of the participant. That aspect will be explored and commented on further in Chapter 6, but from the perspective of conducting the interview, however, it is felt that the question could be tackled differently to attempt to counter the significant differences of response that were exhibited when posing this question. While there were attempts to refine and alter how the question was posed in later interviews, this was not always successful in exploring what is, admittedly a somewhat nebulous concept. In retrospect, it is also noted that no alternative models, such as those explored in Chapter 2: Context, were explicitly described or offered in framing this question. In effect, then, this question became a form of pseudo knowledge or awareness spot-test which it wasn't necessarily intended to be, albeit a question that did provide some interesting responses. It is not clear whether introducing descriptions of alternative models would help or hinder the discussion at that point, but it should also be noted that if a participant were familiar with other 'models' to describe sustainability relationships, they were in no way hindered from offering them in the following discussion. and that would also benefit.

Additionally, there were similar difficulties in posing what was, by design, the final question in the interview:

> *What do you understand by 'furthering the achievement of sustainable development' [Climate Change Act 2009]?*

In retrospect, this question also suffered from being difficult to flow into naturally from the previous questions, despite being posed in a clear and straightforward way with clear context. The answers received were nonetheless revealing and this will be picked up in more detail in the following chapters. What is of interest to note here, though, and

would be addressed if this research exercise was repeated, was the level of difficulty experienced in posing the question naturally and in a way in which it was felt that the participant knew what was being asked of them. With this question, it may have even been beneficial to have the wording that was being referred to in written form as an aid the respondents to gather their thoughts more clearly on them.

Aside from this, the following observations are offered in the context of the data collection having now been completed:

Firstly, and as is mentioned above, none of the participants are 'sustainability accredited' by the RIAS and, while in some ways this has ensured a more 'typical' participant, and this was intentional from the outset. It has however, also left a voice out of the date – albeit a minority voice. It is therefore noted, again, that if this research exercise was repeated or expanded that some participants with such credentials might be deliberately sought out. Having said that, it would clearly be equally unhelpful and unrepresentative to include too many such participants, but they may have proved useful to include to note any clear divergence from the other participants

Secondly, as Rapley (2004) contends, successful interviewing can be a 'mundane interaction' i.e. it doesn't need to be overly complicated when approached as being a conversation between two people, which has been the approach adopted in the research as far as has been possible. Rapley is also correct to observe that 'there is no ideal interview' (ibid) and that has been the experience of the interviews undertaken for this research. Every interview was different and a different felling of 'success' or otherwise was felt after each one but when taken together, the exercise has produced a wealth of fascinating insight, opinion and, ultimately, data for analysis as will be discussed in the following chapters.

4.8 Chapter 4 – Summary

This chapter has outlined how semi-structured interviews were utilised for the Data Collection component of this research. This has included details of how participants were recruited and the issues that were faced in doing so; how the interview questions were formed and piloted and how the interviews were conducted. Further to this there is an overview of the participants, including the diversity and differences across the participants while, finally, there is are some relevant reflections offered on some of the issues covered raised in this chapter.

In the following chapter, Chapter Five*: Data Analysis,* it will be shown how these interview data have been analysed, and the phases of analysis that have been applied to code the data for the development of themes. These themes will then be discussed and explored further in Chapter 6: *Discussion.*

CHAPTER FIVE

DATA ANALYSIS

'Order is not enough. You can't just be stable, and secure, and unchanging, because there are still vital and important new things to be learned.'

Jordan B. Peterson (2018)

5.1 Introduction

The purpose of this chapter, in conjunction with Chapter 6: *Discussion* is much like that of a 'results' chapter. Since the discussion portion in Chapter 6 – which incorporates the final stages of the analysis process – is lengthy, the background, description and detail of the analysis process will be laid out separately in this chapter.

While no experiments were conducted *per se*, the interviews nevertheless produced a significant amount of data – including approximately 149,000 words of transcription – that is suitable for analysis. In this chapter, then, there will be consideration of the different approaches or 'modes' of analysis that can be used to process and organise the data from research interviews. This is to allow for a more holistic understanding of the analysis *process*. There will then be a description of the approach that has been adopted for this research, illuminating the underlying rationale for this, before presenting the initial analysis output – the coding – as a pre-cursor to the final phases of analysis and discussion that will be included in Chapter 6.

5.2 Modes of Analysis

There are several ways that the analysis of qualitative interview data can be approached, or conceived of, and in the following, there will be a brief look at some of these options, before laying out the method that has been chosen.

In Fellows and Liu (2008), building on the work of Tesch (1991), they provide three categories of approach to analysing qualitative data *generally:*

- *Language based:* Focussing on the use of language and what it means, including 'symbols' such as language and gestures to interpret intent. Conversation analysis, discourse analysis and ethnomethodology are identified as some examples of this.
- *Descriptive or interpretive:* This category of research attempts to 'develop a comprehensive view do the subject material from the perspective of those who are being researched' i.e. the participants.
- *Theory-building:* This category of research attempts to develop theory from the data that has been collected and an example of this would be 'grounded theory'.

In Brinkmann and Kvale (2012), focussing on interview data, this general approach is expanded, and some key approaches are provided for the analysis of interview data, as follows:

Analysis Focusing on Meaning

- Meaning coding
- Meaning condensation
- Meaning interpretation

Analysis Focusing on Language:

- Linguistic analysis
- Conversation analysis
- Narrative analysis
- Discourse analysis
- Deconstruction

General Analysis

- *Bricolage*[62]
- *Theoretical reading*

Based on the guidance provided by these first two approaches, this research would fall under the *descriptive or interpretative* approach of Fellows and Liu and under the *Analysis Focusing on Meaning* approach provided by Brinkmann and Kvale. Further to this, Brinkmann and Kvale (2015) provide further guidance on different modes of analysis that may be used beyond the choice on *focus* that they describe, that of: *Induction, Deduction and Abduction.*

Induction is described as 'without doubt the most widespread approach to analysis' and is a mode of analysis that attempts to makes *generalised* observations about a given set of data or circumstances. Inductive analysis is often an approach to a subject 'without

[62] Bricolage is not a word that is in common usage, but is understood to mean something that is constructed of the materials that are available to hand or a variety or diversity of sources. See https://dictionary.com/browse/bricolage (accessed 27th December 2019)

too many preconceived ideas to test' and in the coding of data can be used to 'identify patterns and formulate potential explanations of these patterns.
Deduction is described as a knowledge producing process to deduce hypothesis that are testable from general theories, with the intention of falsifying these. The deductive mode is not without its difficulties, with the principle problem being cited as a difficulty for the researcher knowing whether to reject a hypothesis or ignore their observations where an observation may contradict the hypothesis held and general theory. However, Brinkmann and Kvale (ibid) do note that under certain circumstances, the deductive method can be used in qualitative inquiry successfully.

Abduction is described as a mode of analysis used in situation of *uncertainty* where understanding or explanation is sought. In essence, when faced with an observation that is unexpected, an abductive approach allows for the use of *provisional* explanations until the situation or data is better understood. This mode of analysis will not be applied in this research.

As far as a step-by-step process to analyse interview data, Greenfield (2002), offers the following:

1. Collect the data
2. Data reduction
3. Data Display
4. Draw conclusions
5. Verify findings

This is described as an *interweaving* process between data collection and analysis – which allows for the effectiveness to be tested as the process proceeds and adjustments to be made where necessary.

It is Braun and Clarke (2006), however, who offer the more comprehensive step-by-step approach – that of Inductive Thematic Analysis. This will be the approach adopted in this research and the process 'phases' will be explored in the following sections.

5.3 Thematic Analysis

Thematic analysis is described by Braun and Clarke (2006) as 'a method for identifying, analysing and reporting patterns (themes) within data'. In part, this is achieved by 'coding' the transcripts of the interviews. Coding is an integral part to qualitative analysis of interviews, as has been indicated above, and is a means of gathering and collating the different pieces of related information that exist across sources. Further to this, computer aided analysis can be used to make the process more accurate, to systematically identify themes and developing theory where appropriate or applicable. Further to this, and to go beyond an objective, descriptive mode of analysis and 'attempt to theorize the significance of the patterns and their broader meanings and implications' (ibid) and begin 'to identify or examine the underlying ideas, assumptions, and conceptualizations' (ibid), it is necessary to adopt aspects of 'latent' thematic analysis and thus adopt a subjective, interpretative approach to the data in order to develop themes, which will be laid out and discussed in Chapter 6: Discussion.

As is also explained by Braun and Clarke (ibid) the intention for this research is to be *inductive* rather than *theoretical* thematic analysis. That is, a 'bottom up' approach where the themes are derived from the data that arises from the individual questions posed in the interviews. The outcomes of the theoretical approach, of course, cannot always be avoided and some themes are, unavoidably, not entirely disconnected from the form of some interview questions. The themes that are developed are, thus, data driven, as far as possible:

> *Inductive analysis is therefore a process of coding the data without trying to fit it into a pre-existing coding frame, or the researcher's analytic preconceptions. In this sense, this form of thematic analysis is data-driven. (ibid)*

This development of themes will be re-visited in Chapter 6: Discussion, where it will also be shown that, along the same lines as being either *inductive* or *theoretical,* the process of developing inductive themes can be thought of as an 'organic' approach (Braun and Clarke, 2016)

As far as linking the mode of thematic analysis to the methodological and philosophical assumptions made in this research, assurances are provided as to its adaptability and applicability to *critical realism* specifically:

> *…thematic analysis is not wedded to any pre-existing theoretical framework, and therefore it can be used within different theoretical frameworks (although not all) and can be used to do different things within them. Thematic analysis can be an essentialist or realist method, which reports experiences, meanings and the reality of participants, or it can be a constructionist method, which examines the ways in which events, realities, meanings, experiences and so on are the effects of a range of discourses operating within society. It can also be a 'contextualist' method, sitting between the two poles of essentialism and constructionism, and characterized by theories, such as critical realism… Therefore, thematic analysis can be a method that works both to reflect reality and to unpick or unravel the surface of 'reality'.* (Braun and Clarke, 2006)

5.4 Phases of Thematic Analysis

Similar to the steps offered by Greenwood (2002), above, Braun and Clarke (2006) outline the following, readily accessible[63], step-by-step process of 6 'phases' to conduct a thematic analysis:

1. Familiarity
2. Generating initial codes
3. Searching for themes
4. Reviewing themes
5. Defining and naming themes
6. Producing the report

[63] The following note is offered in Braun and Clarke (2006), that highlights why it is particularly suited to this research, rather than other, more detailed accounts of thematic analysis:

> *Boyatzis (1998) provides a much more detailed account of thematic analysis. However, we do not feel that it is a particularly accessible account for those unfamiliar with qualitative approaches. Moreover, his approach differs from ours in that, although he acknowledges the subjective dimension of qualitative analysis, his approach is ultimately, if often implicitly, located within a positivist empiricist paradigm.*

Further, the advantages of thematic analysis are collated by Braun and Clarke in the following list (ibid):

- Flexibility.
- Relatively easy and quick method to learn and do.
- Accessible to researchers with little or no experience of qualitative research.
- Results are generally accessible to educated general public.
- Useful method for working within participatory research paradigm, with participants as collaborators.
- Can usefully summarize key features of a large body of data, and/or offer a 'thick description' of the data set.
- Can highlight similarities and differences across the data set.
- Can generate unanticipated insights.
- Allows for social as well as psychological interpretations of data.
- Can be useful for producing qualitative analyses suited to informing policy development.

These phases will now be considered below and, while the phase names are largely self-explanatory, some involve significant components of the analytic process and will be highlighted for specific consideration.

5.4.1 Phase 1: Familiarity

Following the collection of data, as is discussed in Chapter 4 *Data Collection*, the first phase of analysis it to become familiarised with or immersed in the data. This includes the taking of initial notes, but the most significant aspect of this first phase to is to read and re-read the transcriptions.

Transcriptions

Having also mentioned the transcriptions briefly in Chapter 4, this is a useful opportunity to make some further comments on the transcription process. And provide a response to the imploring of Brinkmann and Kvale (2015) that 'There is one basic rule in transcription—state how the transcriptions were made'

For the avoidance of doubt, then, the following features should be noted about the transcriptions of the interviews. First, the transcriptions were made directly from audio recording taken of each interview and all the transcriptions were carried out by Alastair Oliver (the researcher). The transcriptions are written as verbatim accounts of each interview encounter, attempting to replicate the exact spoken words of the interview as closely as possible, as suggested by Crang and Crook (2007) to ensure methodological rigour. The other feature to mention is the 'mark-up' of the transcriptions. Since this research is *not* an attempt at either discourse analysis or conversation analysis – a point that is reiterated several times in this thesis – there was no attempt to apply anything similar to a 'Jefferson' transcription technique. More can be found on this transcription mark-up technique in descriptions provided by Jefferson (1983) and Bolden and Hepburn (2012). In short, 'Jefferson' transcriptions are highly annotated transcriptions that attempt to describe every feature of the spoken interaction. As Barbour (2008) describes, it as the 'mechanics of talk' that allows for 'the minutiae of interaction to be captured, including timing of pauses, overlaps in talk and details such as rising and falling inflections, and even a laugh inserted mid-word…'

In the transcriptions made for this research, pauses are indicated, and some annotations are added, too. such as '[long pause]' or '[laughs]', other relevant indications of non-verbal communication, as suggested by Crang and Crook (2007) and indications of redacted (sensitive, confidential) information. Beyond this, it was not deemed necessary to annotate anything else, as it is not necessary for thematic analysis.

With reference to this first phase of the thematic analysis, it should be noted, too, that the act of transcription itself is a crucial and integral part of the analysis. This is because it requires the researcher to re-visiting the scene of the interview in a distinctly different, and involved ways, to simply reading through the transcription and, as such, offers further insights into the data.

5.4.2 Phase 2: Generating Initial Codes

A code is described by Saldana (2008) as follows "A code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data"

Following the familiarising phase of the analysis and the taking of preliminary notes, the initial coding can take place. As is mentioned elsewhere, the coding of the transcript documents was done electronically in the software programme, NVivo 12 and this software was utilised from beginning of the initial coding stage. The initial coding is a repetitive process and involves systematically working through all the transcriptions multiple times, 'tagging' words, phrases and sections to a particular code – a word or a descriptive phrase – that then begins to form multiple collections around these codes.

The finalised list of 'initial' coding for this research is found at the end of this chapter, but before presenting them, the following section will consider some aspects of codes and the coding process, before briefly outlining the elements of Phases 3-6 of the thematic analysis.

Computer Aided Analysis

At this point it is important to very briefly highlight the use of computer programmes to aid the process of analysis, and particularly the coding element of this. Using a computer programme can be a tremendous labour-saving activity and can replace many hours of time-consuming activity with a highlighter pen or pair of scissors, but *they cannot do the analysis*. As Barbour (2008) notes, 'No package can generate new codes or ideas.' The analysis process is entirely dependent on the thorough successful and relevant coding process of the researcher and as Brinkmann and Kvale (2015) pointedly state, ' The programs are aids for structuring the interview material for further analysis; the task and responsibility of interpretation, however, remain with the researcher.'

Coding

Although thematic analysis is a relatively straightforward form of qualitative analysis, as Braun and Clarke (2006) assert, it is still not an easy process when conducting it for the first time. Coding is an 'inherently subjective' process (Braun and Clarke, 2016) but ultimately, it is by spending concerted time and iteratively re-visiting the data, that the coding process is completed. Once data saturation has been achieved, as described by Fuschs and Ness (2015), and not more coding is feasible, the phase of thematising the codes can begin. Codes should represent features in the data that are either semantic, content or latent (Braun and Clarke, 2006) and appear to be of interest to the broader aims of the research. Occasionally there will be a 'picking bluebells' phrase, as noted by Barbour (2008)– which will be coded accordingly – and 'may sum up complex and intriguing ideas' (ibid)

Some codes, too, will be readily accessible because they reflect directly on a question that has been posed. These *a priori* codes as referred to by Barbour (ibid) should be expected and, indeed, welcomed as it shows the data being gathered is addressing the concerns of the research. Ultimately, codes are a choice between being data driven or concept drive (Brinkmann and Kvale, 2015) or, as Braun and Clarke (2016) describe it 'coding occurs at two levels – semantic or manifest meaning; latent or implicit meaning…'

5.4.3 Phases 3 and 4: Searching and Reviewing

As has been indicated above, the processes of Phase 3 'Searching for Themes' and Phase 4 'Reviewing the Themes' are largely self-explanatory and, in fact, quite difficult to represent here. Phase 3 is the crystallising and re-focussing of the codes into developing themes and, for this research, involved various different 'visions' and 'maps' of potential themes that might be developed along with a considerable amount of scribbling and re-scribbling of ideas on paper. This is described by Braun and Clarke (2016) as 'tussling' with the data and culminates with Phase 4 where the data is reviewed. In Phase 4, Braun and Clarke (2006) describe a two-stage review. Stage one, involves checking the themes against the coded data, checking for coherent patterns and 'themes that adequately capture the contours of the coded data' and stage two, a similar process compares the individual themes, and their validity, against the entire data set. Although there is no 'map' provided here to demonstrates the process of

Phases 3 and 4, this will become clear in Chapter 6, where a vivid representation of this is provided by the collation of 'strands' to form the themes.

In all this, it is also important to also highlight a central aspect to the thematic analysis of data in this context, as provided by Braun and Clarke:

> *'…analysis is not a linear process of simply moving from one phase to the next. Instead, it is more recursive process, where movement is back and forth as needed, throughout the phases.'* (ibid)

5.4.4 Phases 5 and 6: Defining and Reporting

The process and output of *Phase 5: Defining and naming themes* and *Phase 6: Producing the report* will be clearly laid out in Chapter 6 and 7, which follow. As such, there is not much that can be said in relation to Phases 5 and 6 at this point.

5.5 The Codes

Further to the information provided above in section 5.3.2, the following two 'screenshots' from the software programme NVivo 12, showing the final state of the data coding, prior to the development of the themes.

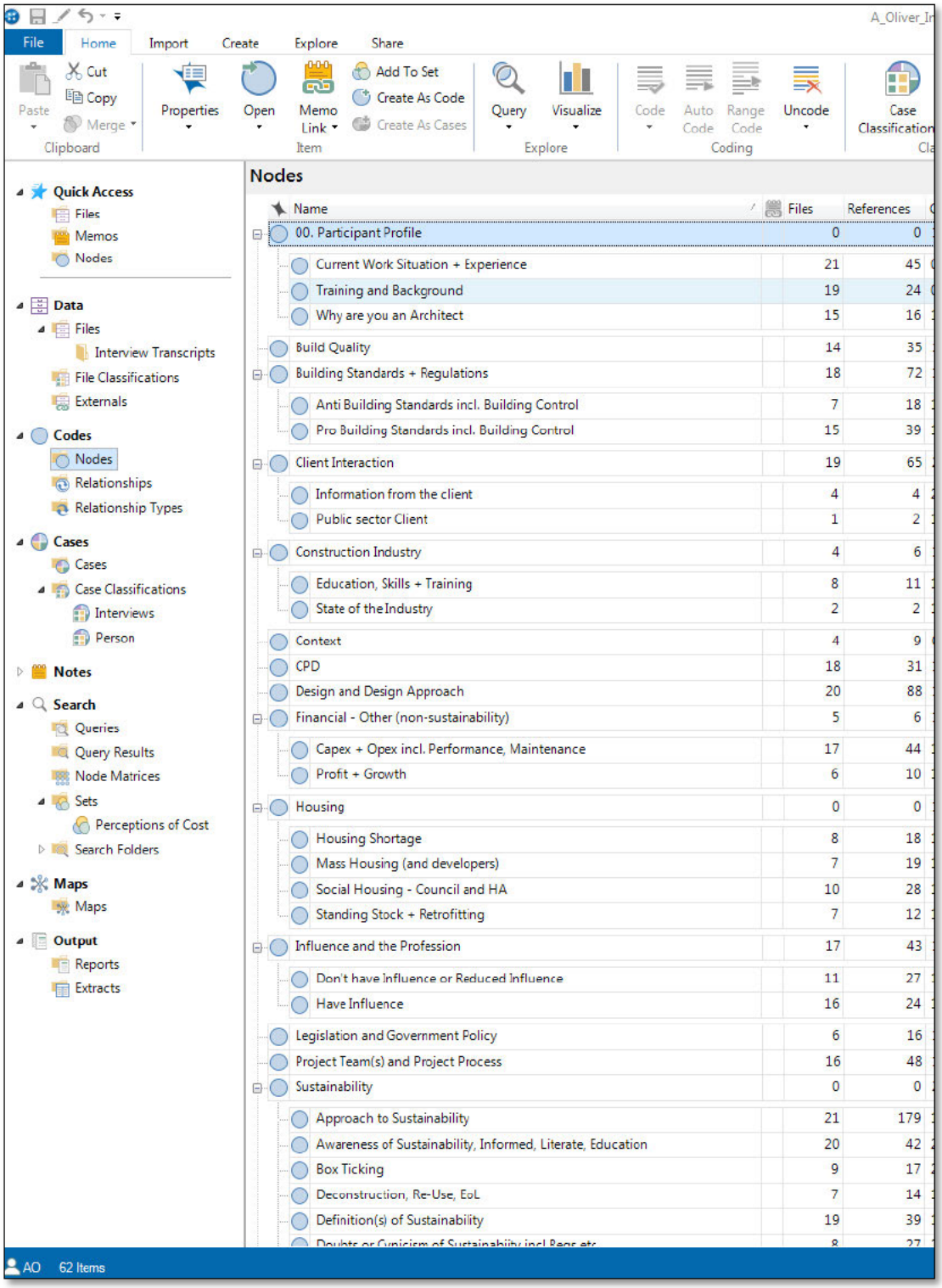

Figure 5.1: NVivo Screenshot 1 of 2

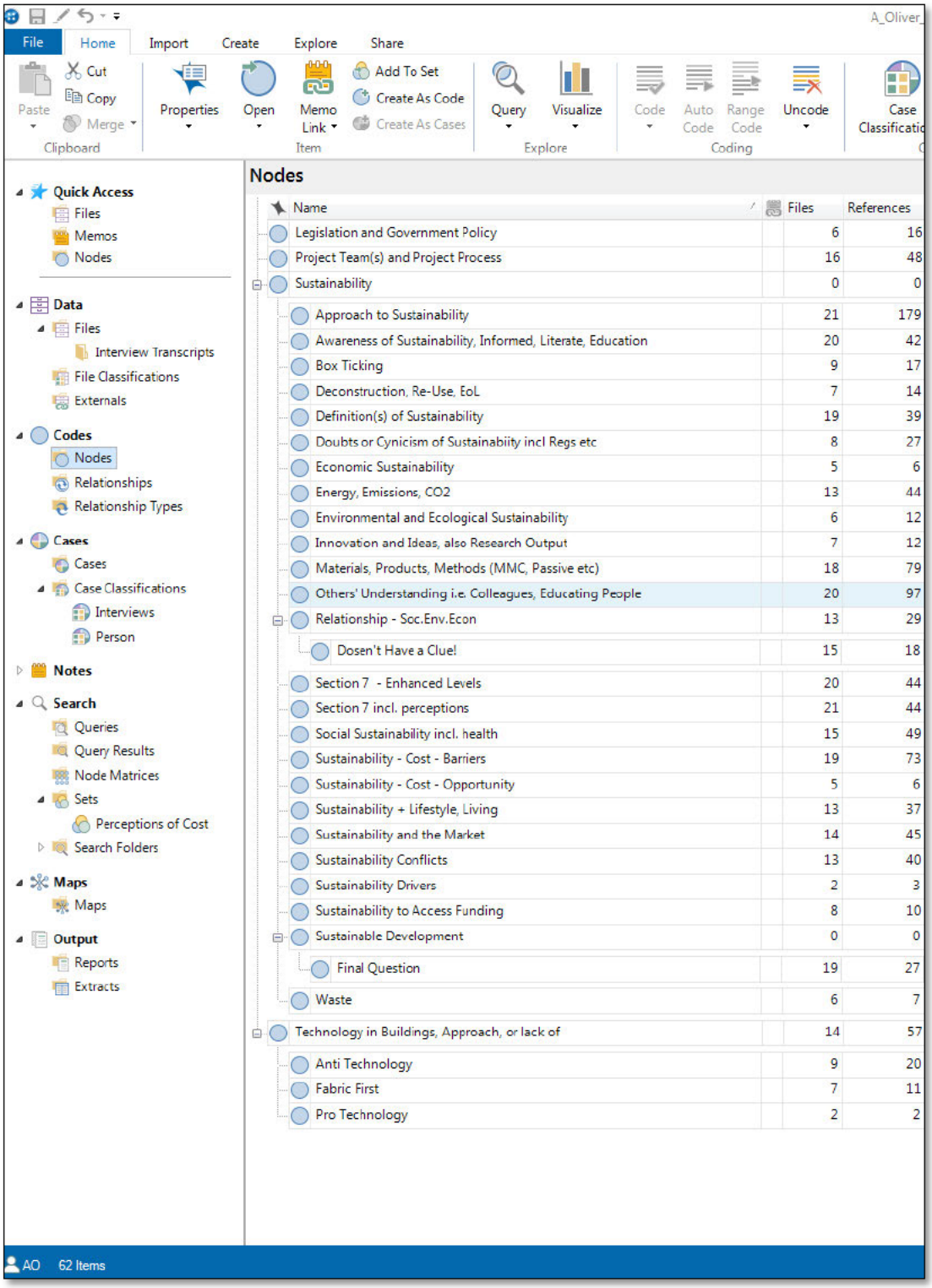

Figure 5.2: NVivo Screenshot 2 of 2

5.6 Data Analysis Challenges – A Reflection

There were several challenges that the Data Analysis process presented, and they were met in different way. On a practical level, the data analysis was a considerable task and on occasion proved to be both laborious and onerous. Difficulties were encountered with maintaining focus and engagement with the subject material. It would be all to easy in such situations and 'go through the motions' - particularly when transcribing such voluminous transcription data, however this was absolutely crucial to the 'familiarisation' phase of the process as outlined by Braun and Clarke (2006), which lays the foundations for coding and, ultimately, the development of themes. Similarly, and reinforcing what has already been described in Chapter 3 *Methodology,* when coding the data there existed the danger for the process to become perfunctory which – while largely avoided – could have been detrimental to the research outcomes had self-awareness of this issue not been deliberately maintained throughout the process.

As far as the *method* presented by Braun and Clarke (ibid) i.e. the six-phase process, it was both straightforward to conceive of and put into practice. However, as shall be discussed in greater details in Chapter 6 *Discussion,* there emerged the need to adapt the method a little to introduce the additional, novel, aspect of *strands* to assist with the processing of the data and presenting the themes in a more accessible manner.

Regarding the *methodology* and its relationship with the data analysis process, there were no significant difficulties *per se* but that is not to say that it wasn't a challenging experience – since it certainly was for the most part. The principle challenges largely presented themselves in the same was as the practical aspects did as has been described above. That is, in the necessity to maintain cognitive engagement with the methodology and the search for relevant and applicable knowledge and meaning throughout the process of coding and theme development. The solution – and what ultimately led to the successful outcomes that have been achieved – was to remain engaged with the different aspects of the philosophical approach that has been adopted and elucidated in this research. In doing so, the applicable features of the interpretivist approach and benefits of insight offered by critical realism could be harnessed to support the process of theme development.

5.7 Chapter 5 Summary:

This chapter began with a discussion of the *general* approach to qualitative data analysis, before a more detailed look at the 6 Phase thematic analysis process, specifically designed for interview data, that has been developed by Braun and Clarke (2006). In this discussion, transcription and computer aided analysis were specifically considered as part of a wider discussion relating the identification of codes and development of themes for Phases 1-4 of the thematic analysis process. This was followed by a depiction of the final set of codes in this research with screenshots obtained from the analysis software.

In Chapter 6: *Discussion*, which follows, the themes will be laid out in details and each one discussed – setting the scene for the final conclusions recommendations that will be laid out and considered in Chapter 7.

CHAPTER SIX
DISCUSSION

'A world of standards,
but not a standard world'

Timmermans and Epstein (2010)

6.1 Introduction

Having now laid out the codes that were identified from the interview data in Chapter 5, the next stage in the analysis process – as outlined in Chapter 5: *Data Analysis,* is to crystallise these codes into *themes.* In line with the stages outlined by Braun and Clarke (2006) which have been adopted for this research, this process of identifying, developing and discussing themes culminates with Phase 6: *Producing the report*. Later portions of this chapter, in conjunction with Chapter 7: *Conclusions and Recommendations* will fulfil that phase of the *Thematic Analysis* process. Prior to that, and having reviewed the coding as detailed in the processes for phases 3 and 4: *Searching for themes* and *Reviewing themes,* the bulk of this chapter will focus on the output from phase 5: *Defining and naming themes* to form a discussion around a selection of the themes that have emerged and been identified in this analysis.

Before moving on to a discussion of these themes, it will be useful to consider a number of aspects related to the discussion of themes to help further place them in the context of this research, to reiterate some of the factors related to the boundaries of the research and also, in realistic terms, to clarify both the expectations of this research and the depth of analysis that will be possible.

6.2 Making Sense of, and Structuring the Data – Thematic Analysis

The level of analysis is bounded by the ability to move from semantic (descriptive moving into interpretative) themes to latent (causal, ideological, underlying) themes (Braun and Clarke, 2006) This research analysis is primarily *semantic* but will allow the latent to emerge where possible, although this is not necessarily expected to any significant degree. Where possible it, these broader, latent aspects will take the form of a musing commentary, woven into the discussion.

Further to this, the following is offered by Braun and Clarke (2006) and, it seems that this primarily suggested in the context of being a *disadvantage,* but it is not taken as such in the context this research and the outcomes that are anticipated:

> *Other disadvantages appear when thematic analysis is considered in relation to some of the other qualitative analytic methods. For instance, unlike narrative or other biographical approaches, you are unable to retain a sense of continuity and contradiction through any one individual account, and these contradictions and consistencies across individual accounts may be revealing. In contrast to methods similar to DA* [Discourse Analysis] *and CA* [Conversation Analysis]*, a simple thematic analysis does not allow the researcher to make claims about language use, or the fine-grained functionality of talk. (ibid)*

In this research this is taken as helpful way-finding, since it is not intended to consider this 'fine-grained functionality of talk'. The preceding chapters have already laid out the aims and objectives for this research and it does not include in-depth, individualised accounts of the latent and as-yet undiscovered social world of an archetypal architect. Indeed, as has already been clarified in chapter 3: *Methods and Methodology*, a footnote is offered in anticipation of 'the exploration of generalised meaning' and in many ways, this is what sums up a great deal of what is hoped for in the output of this research. As Schweber (2015) notes:

> *…Generalization, for interpretivists, thus lies in theory development, where the term 'theory' refers, not to the development of general laws, but rather to the identification of mechanisms and processes, whose effect varies across different contexts.*

Further, as Brinkmann and Kvale (2012) suggest, there is no point in searching for the 'real meaning' anyway as it will lead to 'endless pursuits of an undefined and fictitious entity' (ibid). Although not specifically aimed at the type of research being undertaken here, it is nonetheless a cautionary reminder at what this research has and has, not set out to do.

Crucially, by employing the method[64] of *Thematic Analysis* and situating it under the methodological assumptions of *Critical Realism*, as has been discussed in Chapter 3: *Methods and Methodology*, this research is ideally situated to explore and discover applicable meaning and insight from the interview data as Braun and Clarke (2006) note:

[64] Braun and Clarke (2006) would argue that thematic analysis should be considered a method in its own right

> *Thematic analysis can be… characterized by theories, such as critical realism., which acknowledge the ways individuals make meaning of their experience, and, in turn, the ways the broader social context impinges on those meanings, while retaining focus on the material and other limits of 'reality'. Therefore, thematic analysis can be a method that works both to reflect reality and to unpick or unravel the surface of 'reality'. (ibid)*

In addition to this, Murtagh *et al.* (2016) note that under critical realism, where it may be assumed that knowledge is 'contextual and perspective dependent', it can lead to a qualitative method in which 'participants' experiences and meanings are focal'.

As has already been established in Chapters 1: *Introduction* and Chapter 2: *Context*, the ultimate intention of this research – via as pragmatic an approach to the data as is possible – is to provide insight and guidance that can be applied to the Building Standard and their governing policy, the construction industry and architectural training and profession for their mutual improvement. This pragmatic approach is bounded by certain things such as the experience, abilities and theoretical understanding of the researcher but also purposefully on the part of the researcher. Consequently, the *depth* of meaning is constrained by these various factors. That is not to say that the meaning discovered in the data is not useful, it is just important for the *reader* to be cognisant of the fact that the *researcher* has deliberately attempted to avoid being overwhelmed and distracted by the myriad sociological and theoretical nuances that could otherwise be explored by associating specific words and phraseology with meaning and 'reality' to too great a depth. Again, as has been re-iterated above, this is where the approach of *Critical Realism* displays its strength and applicability by helping to 'fence' these parameters and expectations.

6.3 Discussion Style

From this point on the writing style of this chapter will change, moving – at times – to a first person perspective. This is to allow the themes and generation of themes, where appropriate, to be discussed as a narrative account of the interactions between myself (the researcher) and the individual participants, but it will also help me (the researcher) attempt to tell you (the reader) the 'story' of these themes and what they can tell us in a more fluid and 'natural' way. Often, this is simply by allowing a

particular set of collated contributions to speak for themselves as far as is possible – to allow the designers themselves and their plainly spoken contributions to tell this story that is presented in the themes.

Once we move on to the narrative of each theme there will, in places, be a considerable amount of data to interact with – in the form of quotes from the interviews. Some of these will be lengthy and even, it is acknowledged, verbose in places. However, they are as accurate a representation of what was said as is practicable and in places there is an indication of *how* it was said, too. This is not to bestow any further meaning on the words, but to show that they are the result of an interview *interaction* and should be considered accordingly. These data are not pre-prepared answers to known questions in a sterile environment, but the result of a conversation between two people and it is felt that they need to be given the context and opportunity to speak for themselves. As has been mentioned in Chapter 5: *Data Analysis*, the transcribing did not adopt a 'Jefferson' style but as will be seen below, some elements of speech have been included to give a better sense to the reader of what was said. In addition to this, simple mark-up has been used to indicate a pause using ellipses '…' and adding square brackets '[…]' to indicate a break, where additional words have been skipped in the quoted section from the interview transcription, which can be found in the appendices. Beyond that, the only other mark-up that has been used is *italics*, to highlight a word that has been emphasised by the participant.

Further to this, I have developed for this research a novel style of presenting the discussion: the layout of each 'Theme' adopts what I describe as a *Letters Page* style – where the quotes are laid out – in no particular order – in a similar way to the 'letters' page of a newspaper. This format is employed for several reasons. First, is the practicality of the quotes being much easier to read and access. Secondly, it is a more suitable format to give an indication to the breadth of views that may exist in a theme or *strand* of a theme (which will be explained below). Thirdly, it is constructed in this way to enhance the narrative style that is desired, and the notion of different *perceptions* being collected – snapshots of what the different designers think and say about what was discussed in the interviews, in the same way that somebody may write a letter to the editor of a newspaper to offer their opinion.

6.4 From Codes to Themes

The first thing to note as we begin to consider the themes is that Thematic Analysis is not an easy task to undertake – especially for the first time! This is my first time doing this type of research and, consequently, there has been an unavoidable 'feeling my way' through the process. Thankfully, an advantage of Thematic Analysis noted by Braun and Clarke (2006) is that it is 'Accessible to researchers with little or no experience of qualitative research.', so, while being a difficult task to undertake, it has resulted in successfully identify the themes that will be laid out in the following section.

From 21 interviews, there are almost 20 hours of audio that has resulted in approximately 149,000 words of transcription and this is a lot of data to crystallise into to themes. It is not just a process of collecting and interchanging codes into themes, as this discussion cannot simply be a report on what people said in response to the interview questions – it needs to look beyond that. Otherwise, this whole chapter could be laid out in the format of: Question1: 21 answers, Q2: 21 answers and so on, but that wouldn't build the picture, or narrative, that is needed to assist the process of sensemaking of the whole of the data that is taking take place.

The codes and sub-codes that have been laid out in the chapter 5: *Data Analysis* have been reviewed through different iterations – a process that is admittedly difficult to demonstrate here – but what follows in this chapter is the crystallising of these codes into themes and sub-themes, or *strands.* It should also be noted that the data in this research has the potential to become overwhelming for the researcher. There is a huge amount of different ways to organise the data, and far too many to include in this research without it becoming unwieldy. Even with the narrower focus of 'sustainability' in the data, there are many features of the data that won't be mentioned here, even although they may be readily identifiable in the data.

6.5 What Counts as a Theme?

Braun and Clarke offer three invaluable points that assist in this analytic process of establishing the themes. First, is a straightforward definition to work from that:

> *A theme captures something important about the data in relation to the research question, and, represents some level of patterned response or meaning within the data set. (Braun and Clarke, 2006)*

Second, is a concept to remember:

> *'What we have to have is a clear conceptualisation of what those themes **represent**, and **how** and **why** we treat them as significant.' (Braun and Clarke, 2016)*

Third, is a reassurance to make the best of things, and give it a go:

> *'There is no widely agreed on definition of a theme, with conceptualisations of a theme varying widely; procedures to identify themes also vary.' (Braun and Clarke, 2016)*

Further to this, Braun and Clarke (2016) illuminate two broad schools of thought on themes – not too dissimilar to the notion of *inductive* and *deductive* coding that was visited in Chapter 5 – and they discuss how themes might be viewed as being either 'identified' or 'developed'. In the identification approach, they say, quantitative logic is applied and the identifying of themes is a process to capture something that conceptually pre-exists the analytic process. In this approach, the coding aspect 'in conceptualised as a process of searching for evidence of identified themes' (ibid). An alternative view, described by Braun and Clarke, is that of 'organic' thematic analysis. In this approach, the process of developing of themes is 'exploratory and inherently subjective, involving active, creative and reflexive research engagement' (ibid) In this alternative view, Braun and Clarke envisage the researcher 'tussling' with the data to develop their analysis and subsequent themes.

In this research, the intention is very much to fall under the 'organic' approach as much as possible, but it must also be acknowledged there are unavoidable elements of the 'identification' approach in the themes too. Although not deliberate, it is probably an identifiable factor due to the way the interview questions were constructed and conceived and, could arguably, be described as being set out thematically. It is only with hindsight that such features can be seen, but it is not felt that this undermines the validity of the themes, since the intention was 'organic', and this is reflected when looking at the themes as a whole.

6.6 Themes – Structure

Finally, a few words on the structure of each theme that will be laid out and discussed in the following sections. In addition to the more 'digestible' style that has already been described, each theme is structured in a format that will further assist this.

Each of the five Themes are made up of *strands. And each of t*hese strands are represented by a *collection* of quotes from the participants. The collections are not laid out in any particular order and there is no limit to how many times a participant appears in a single collection. Similarly, there is no minimum number of quotes in any single strand. This format of themes and strands helps to provide a clearer picture and underlying logic to how and why each theme has been developed.

Following a brief discussion of each strand, there will be links made with the relevant literature where possible, and this will be possible to varying degrees across the strands due the somewhat nuanced nature of some of the strands.

As has been mentioned in the introduction to this chapter, the final conclusions on the themes their *generalisable* meanings, implications consequent recommendations will be laid out in Chapter 7: *Conclusions and Recommendations.*

6.7 Themes – Identified

The themes listed below will form most of the discussion in this chapter and a concluding discussion will take place in Chapter 7: Conclusions and Recommendations, to complete Phase 6 (*Produce the Report*) of this Thematic Analysis.
In line with the aims and objectives of this research, and the over arching desire to explore and make sense of the *lived experience* of architectural designers, the themes have been organised, or framed, as *perceptions*:

Theme 1: Perceptions of Cost
Theme 2: Perceptions of The Building Standards
Theme 3: Perceptions of Technology
Theme 4: Perceptions of the Profession
Theme 5: Perceptions of Knowledge and Understanding

Indicator Themes

In addition to these five principal themes, there will also be a short consideration of some other relevant 'indicator' themes that were identified in the data.

Even although *volume* or *frequency* of codes do not necessarily map to a theme *per se,* the following 'indicator' themes are deemed worthy of mention due to their interest factor and, while they are not all necessarily represented in any great quantity across the data it is useful to include them, as Braun and Clarke (2006) point out that it is 'important to retain accounts that depart from the dominant story in the analysis':

Indicator Theme 1: Taxation Innovations
Indicator Theme 2: Housing Shortage
Indicator Theme 3: Lingering Thoughts on Definitions
Indicator Theme 4: Perceptions of Perceptions

So, as has already been acknowledged, it is not possible to discuss *every* feature and indicator that was identified in the data, but these 'indicator' themes are apparent enough and are interesting enough that they cannot be ignored in this discussion and, as far as they provide an additional contribution to the aims and objectives of this research they also add to the richness of the different elements of the stories being told with this thematic analysis.

Theme 1: Perceptions of Cost

The story, or message of this theme is one of the significant impact that cost has for 'sustainability' deliverables in the built environment. Construction projects are – almost without exception – dictated by the 'bottom line', and this is hardly surprising. It would not be a ground-breaking revelation for this research to find that builders, constructions firms and every professional involved at every stage of the construction process needs to justify their involvement in a project and the cost associated with them. If this didn't happen, projects would fail to reach completion and, ultimately, companies would cease to be able to operate due to financial collapse. In a sense, the implementation or enhancement of sustainability-related measures in a dwelling is no different. If an individual house builder or construction firm cannot afford to build to a certain size, certain level of specification, quality of finish or include particular

materials or technology – it would normally be the case that *something* would have to be cut from the project or design changes will have to be made to accommodate the budget available. *Participant D* and *Participant A* express this for us in slightly different ways:

> *"Money talks. Money talks. And I guess, Alastair, it's a case of sometimes if you've only got five pounds you can only buy something for five pounds."* ***(Participant D)***

> *"You want to know, obviously, what the client's aspirations are in terms of that [sustainability deliverables]. But along with the discussion about the budget, then that's clearly going to play a part in it. If they don't have the budget, then realistically I know – we can go through the process and we've done it a hundred times, going through the process of saying, you know, "we would like this, this, this, this and this". And once they tell me the budget, I know they're not going to get any of it as they don't have the money."* ***(Participant A)***

As far as what is required to meet the 'sustainability' requirements of the Scottish Building Standards i.e. meeting all the minimum standard of Section 1-6, this optioneering on which elements to include can now only happen to a certain degree. This is because there are now non-negotiable performance levels that must be met, as defined by the Technical Standards as has been outlined summarised in Chapter Two: *Context and a Review of the Literature*. When specifying the make-up of a house, or development to a specific budget, the designer – informed and directed by their client – is therefore faced with certain choices, which ultimately dictate the route taken for the project.

Theme 1: Cost – Strand 1: Aspirations

"when it comes back to money, people's philosophies ideas, aspirations always get compromised"

The first *strand* that we will look at under *Perceptions of Cost*, I have called *Aspirations* and the following collection of quotes provides a snapshot of how some of these interactions take place and how they have been perceived by the designers. This first collection demonstrates the difficulties often faced in fulfilling client aspirations, including the enhanced levels of Silver, Gold and Platinum that can be achieved:

"For some architects, you know, the real committed sector of the profession - which is small - who don't mind, or their clients don't mind the kind of implicit costs of 'uber greenness' - well fine, but most of us are in the real world that we have to be pragmatic."
(Participant R)

"Sadly it's also true that having set out with a high aspiration for a project - when that translates to pounds, shillings and pence, people's agendas often change and they're then able, or somehow able, to find the ways around things that were previously sacrosanct as it were."
(Participant D)

"…and I very often find that a big factor in that, that overrides all sorts of other things is cost. that you, you start off with 'oh yeah, yeah, we'd love to do this' and then 'oh wait that costs more than doing the bare minimum, ah right, oh no forget about that then'" ***(Participant H)***

"…it'll come down to money unfortunately. People have got ideals. Architects have all got ideals. You know, we'd love to do everything in a beautiful, sustainable manner…"
(Participant K)

"The punchline for everybody, though, or punchline for 90% of the people, is that they cannot really afford to indulge their dream or aspiration and it always comes back to money, does it not? So, when it comes back to money, people's philosophies ideas, aspirations always get compromised."
(Participant D)

"very rarely do you get people… get clients who want to go past bronze or the bronze active, because it is a, it's a, it's cost driven..." (Participant E)
"Em, we always probably have the, an economic tension where um, generally, […] the wish list is longer than or larger than the budget and therefore it is about making distinct decisions." ***(Participant J)***

"Cost. Cost is always the biggest influence. No matter if anyone comes in here says it's not. Unless they're very privileged and have a big resource that they can throw out and they want to do a building. So, I suppose you'll have... very seldom a client comes in goes "look, money's no object" ***(Participant S)***

In this Strand, we can see that cost is considered to be a significant limiting factor to fulfilling the sustainability aspirations that clients might have at the beginning of a project. While this does not appear to be a factor that has been visited widely in the literature or specifically investigated in other research, there are indications that this has been identified elsewhere. For instance, Zapata-Lancaster and Tweed (2014) in their ethnographic study of energy regulation in England and Wales and Giesekam *et al.* (2015) looking at construction sector views on low carbon building materials both provide hints at this being a factor. Giesekam *et al.* (2014), referring to the effects of the recession, also states that '…this has served to increase anxieties about cost, and force

sustainability concerns down the priority list'. Ultimately, this strand indicates that where sustainability aspirations exist – as they clearly do for some clients – the ability to realise these aspirations can be severely hampered by the cost realities place upon them. While it is not necessarily the place of the Building Standards or the role of the designer to address this issue, it is something that government and policy makers should certainly take note of, if the sustainability agenda is to be pursued in earnest and this does, indeed, represent a significant hurdle for those who are willing but financially constrained in meeting these challenges in the they would like to.

Theme 1: Cost – Strand 2: The Building Standards

'you have to set aside the money for it'

Our second strand in this theme is a collection that tells of a specific set of perceptions that exist about how cost impacts a designers' ability to meet the requirements laid down by the Building in Scotland, and provides for a mixture of different views:

[With reference to the Building Standards] "…it's eh, probably adding a level of cost to a house now, that perhaps is not required and particularly when there is a shortage of housing, or affordable housing." ***(Participant D)***

"…so whilst we have might have our own personal agenda on how we feel about pushing a particular client down a route of maybe going slightly further than the technical standards require. That's obviously a cost issue."
(Participant E)

"…the government imposes certain legislation so that you're building to a certain standard. Now that's a standard that you have to build to. We try to improve on that so we offer opportunities for improvement, em, but if people have got a certain budget constraint they don't care about the next part, so we build to the legislative requirement…"
(Participant K)

"…that the building regulations provide a really, really useful backstop where we're able to say you just have to do this [laughs] Whether you like it or not and you have to set aside the money for it."
(Participant I)

"I think we should be, we should be achieving the highest level now rather than waiting, waiting for whenever the Technical Standards, decide is the time. But it's the financial side of things that always comes in." ***(Participant N)***

"Particularly, you know, in the last ten years there hasn't been a lot of money to go round and sometimes - it doesn't take much to tip back the balance on how viable or affordable a project is. So just one more layer of legislation [referring to the Building Standards] can, can make a huge difference. It can just tip the balance and it becomes what was affordable is no longer affordable." ***(Participant D)***

"… I suppose you could say if the Regs weren't as tight, they'd be able to build 10% more [social housing] houses than they're able to build under the current Regs. But then when would you ever improve things? So, it's a compromise." ***(Participant A)***

"Well, well, eh, I suppose in all sustainability you can only do what you can affect yourself. And so within my job, obviously the standards are driving at more than we can do now. Because, again, economics affects how much you can do within the building. So...and we're on a tight budget so, yeah, that affects it." ***(Participant V)***

"there just hasn't been the money on many of our projects to, to achieve more than bronze." ***(Participant I)***

"…but generally, the projects we work on are commercially driven and will be pulled back to requirements of the Technical Standards rather than going further than that." ***(Participant E)***

"I mean Bronze is probably enough. The minimum is enough. To achieve more isn't… well, the assumption is that it'll cost more and what's the benefit? ***(Participant G)***

For some of our participants, notably Participant A and D, the Building Standards and the cost burden associated with meeting them represent a clear barrier to the industry's ability to deliver increased output. For Participant I, the Standards represent a valuable means of securing improvement, while Participant A – despite other comments – concedes that evening in being a barrier to output they are a clear route to securing improvement too. Across the rest of this collection there is a clear acceptance of the minimum requirements of the building standards, although to go beyond them is either a financial step too far or, has little benefit, as is expressed by Participant G.

Williams and Dair (2007) pick up on this point specifically in their study looking at barriers to sustainable building in England, so clearly this is now a long-standing factor. What is described here is also a prominent finding for Giesekam *et al.* (2015) and Darko and Chan (2017), who identify cost as a significant barrier to green building adoption. This is also picked up briefly by Imrie and Street (2009) and Schweber (2015), considering 'Zero Carbon Homes' specifically, confirms the extra cost barriers when implementing enhanced specification and low carbon measures.

Theme 1: Cost – Strand 3: Sub-optimal Outcomes (when design loses)

"It's a balancing act, like all architecture"

In this strand our participants tell us some of the *downstream* effects that cost has on sustainability outcomes – particularly highlighting where the outcomes are perceived as sub-optimal for broader sustainability and environmental concerns or just where they see these cost impacts as constraints on their ability, or freedom, to design as they would like to:

"But there are some situations where if you have to build very, very well insulated buildings, for a budget you're likely to be given, they closed cell polyurethane is the material you're going to use and that's all there is to it. There just isn't anything else that's going to be cost effective enough to compete with it." ***(Participant A)***

"…but when it comes down to it, it's all about money at the end of the day. So, at the stage we're looking at an increased budget to cover finials and, you know, just proper slates on the roof - that type of thing. And it's just the eye-catching stuff. When it comes to the, say the sustainable building aspect of it - doesn't come into at all." ***(Participant K)***

"Personally, I don't think they're a long-term fix. [referring to photovoltaics] I think they look hideous too. I, I just don't think that it's money well spent."
(Participant A)

"…the other thing we say along with 'pragmatic sustainability' is that we never forget about the budget. Because everybody wants - we all want - everything. We want to have our cake and eat it, we want our buildings to be as green as green can be, to have a tiny environmental footprint, to be carbon neutral, carbon beneficial. But we have a budget, our clients have budgets. It's a balancing act, like all architecture. You're trying to find the best compromise solution. […] Inevitably you get to a savings exercise and you have to compromise on stuff and you're looking to come out the other end with something that is a... is as, as efficient and friendly environmentally as you can make it. You never, it's like I said at the beginning, like – aesthetically - you never get there.
(Participant R)

"… nobody has enough money to do what they want. Including us. I'm not... given a budget that was, you know, elastic enough I, I still wouldn't build an uber insulated, you know, Passivhaus which will cost you hundred pounds a year. Because architecturally I haven't seen one of those that I feel this is a beautiful building. So, the budget always preys on it and in most cases, the budget ends up winning. ***(Participant R)***

"…so RHI schemes for instance, are the government sort of scheme to promote using sustainable energies or other alternative energies. That proved popular with people because they saw they could get financial gain from it eventually and, em, it worked, that definitely gets things going. And then as soon as that gone […] it's a lot harder for me to sell ground source heating to a client, then just using something that would be a lot cheaper to do. ***(Participant G)***

"The reality is clients can't afford to do a house in sheep's wool and it will add on hundreds and thousands of pounds to the cost. So, the reality is you would use be using fibreglass - which is made from oil. So a non-renewable material. Polyurethane - the same thing. But the reality is if you want to make the building as well insulated as you can so you use uses as little fuel to heat it, as you can. You're not generally going to have the budget to do that with sheep's wool. Cellulose, or any of these other ones - they're all on a scale - but none of them is cheap as the fiberglass and polyurethane." ***(Participant A)***

"…at the end of the day a client's only got so much finance. They need to get the project to stand on its own feet. And... do they want to compromise on that [sustainability] - to them it doesn't really make any difference – or do they want to take five grand off the kitchen budget? And the answer is they don't want to take five grand off their kitchen budget." ***(Participant U)***

This collection, again, provides a variety of differing perceptions amongst our designers. Participant R provides a valuable account of a perception that can be applied not only to this strand, but also to this whole theme – that of *compromise.* Participant A expresses this in terms of sub-optimal materials compromises, and for Participant G this is expressed as a sub-optimal outcome for energy solutions but across the comments from several participants there is the underlying theme of how this impacts design. This can either by in the application of technology that looks 'hideous' or, more generally, the aesthetics or finishes in their buildings.

This strand is not substantially representative of findings in other work, but it is probably fair to say that an undertone of these sub-optimal outcomes is expressed in

other ways, to which cost will undoubtedly be an underlying factor. In Imrie (2007) there are respondents for whom cost was a major determinant to (sub-optimal) design outcomes – in that case when seeking outcomes that exceeded the requirements of the Building Regulations. While not specifically referring to cost and just to the Building Regulations, this strand is reminiscent of the phrase that Liam Ross (Ross, 2011) borrows – with reference to large-scale speculative housing developments in Edinburgh – that they are "more or less the clauses of the building regulations turned into brick and mortar" (Saint, 2001).

Again, there are lessons within this strand for those who develop and drive the sustainability policies that are set for the construction industry and it may be that more recognition needs to be made of the factors laid out in this strand. For example, if design loses, our future architectural heritage loses and if there are material compromises being made where better or more desirable alternatives are available, that is surely a counter-productive set of situations that are being inadvertently ushered in.

Theme 1: Cost – Strand 4: Publicly Funded Dwellings

"Housing Development is saying "can you make, any savings?" And you're like 'come on!'"

In this fourth strand, our relatively small collection is specifically gathered from participants who have either worked directly on publicly funded dwellings (Local Authority or Housing Association) in recent work (Participant A) or currently works for one such housing provider (Participants V and W). Here, we can see both similarities and differences to the broader perceptions offered elsewhere in this theme of *Cost.*

"…even if we get a job within the budget cost, Housing Development is saying "can you make, any savings?" And you're like 'come on!' Because you know fine that when you go on site you're going to spend all the contingencies. ***(Participant V)***

"…our window spec is alu-clad timber when we build. But the maintenance guys are putting in PVC windows." ***(Participant W)***

"Oh yes, so we've always tried to do better than the Standards if possible but em, now the cost just to get it to meet the Standard - there's not much scope to do a lot else." ***(Participant V)***

"…and to be fair - in their defence - if you are a Council and you've got a million pounds to spend in a building. If you make them incredibly passive, incredibly sustainable in terms of energy usage, you can build one or two houses fewer than you could have done if you'd built them with cheap electric heating. They're looking at thousands and thousands on the waiting register for houses. They want numbers. And you can understand that, you know, so it's not quite as bad as I'm making out. I mean, it's not a cynical decision on their part to try and build cheaply. It's because they need to build as many as they can, which is understandable."
(Participant A)

"Because we've got an educated client [Local Authority], who is obviously in charge of the budget. So, I mean, you can say 'it would be better to do this' and they'll say, 'is it going to cost more?' And so, unless they can get additional funding to cover that gap, which they might in some instances, I suppose, if it was a new technology or so something. But again, they might even say, 'well it's a new technology we don't want to take the risk because we can be left with these houses that we've got to re-fit in 10 years' time or something.'"
(Participant W)

While the 'client' is clearly very different for publicly funded housing, the pressures are apparently not too dissimilar in terms of *volume* house building – there is the pressure to deliver as many units as possible for as little cost as possible. In terms of how this relates to sustainability 'deliverables', it is seen that this will impact specification and the ability to go beyond the minimum levels that are required. Participant A certainly recognises the conundrum that publicly funded housing providers find themselves in and is somewhat philosophical in their reflection on this. It is also interesting to note that there is a hint, too, where difficulties occur later in the lifecycle of the building. In this case, a component is selected at construction for its enhanced sustainability 'credentials', only to be replaced some years down the line with a cheaper alternative that was deliberately not included in the construction specification due to its sustainability 'credentials' perceived as being lower.

While this did present itself as a clear strand here, in the literature the focus and interest – particularly in terms of *cost* tends to be retro-fit scenarios involving low-carbon technologies, rather than the design and material specification in a new-build scenario. Sharpe *et al.* (2018) do look at low carbon elements of Housing Association stock in Scotland, and this type of narrow focus is rare in the literature. So, while some

studies have been done, it is this retrofit-scenario that they look at, rather than the particular cost-related aspects that have been identified in this research.
This clearly presents a challenge for those who manage both publicly funded house building and the public-private partnerships that are delivering housing too, not least because these types of housing presented as best practice – or at least something approaching that – for volume house building. It is therefore of crucial importance that the 'public' sector delivery of housing is empowered and funded to avoid some of the situations here, if they are systemic, that are ultimately not far short of becoming self-defeating.

Theme 1: Cost – Strand 5: Capex and Opex

"that's the, it's the one you struggle with the most"

The final strand identified under this theme is that of *Capex* and *Opex* – Capital and Operational Expenditure respectively – and we see here some examples of how designers might conceive of this factor in the work that they do, beyond the simple specification and emissions etc – they see a link to operational as well as the obvious

"Is it better to build a more sustainable home that'll cost less in the long run and what's your duty as an architect to ensure that, you know, we are building a more sustainable world. I think the environment's going to be bigger as time's going on as people are becoming more aware"
(Participant M)

"The question then is, if you're going to pay another 15% it's gonna save you a lot more over the... but you've got to come up with 15% and that is the, the endless, you know, the never-ending conundrum that we're always faced with".
(Participant R)

"I wish in many cases we could say 'a sustainable building costs less' and there's probably a bit of a culture change there as well; they're starting to look at life cycles and all the rest. But again, clients don't tend to look at life cycles - they just look at their upfront expenditure."
(Participant S)

"I think economically, em, that's the, it's the one you struggle with the most - is balancing up the long-term ongoing costs with the initial capital cost. Often all anyone sees is the initial capital cost and doesn't pay any attention to the future costs. Which is always the struggle you have".
(Participant N)

"…looking at the broader aspect of the wider built environment and the impact of… the colossal impact of the construction industry on the environment and I think it'll get more and more demanding as far as building buildings go… And that's a good thing, because it means that people do have to - rather than ten years ago - we said "you might want to do this because it will help your environment" but it will increase your capital outlay by X. Now, they've got to do it, and it is good." ***(Participant E)***

"…we will specify and design to minimise energy usage - both in manufacture and in operation. But we balance that against the financial realities and the operational realities that clients are often faced with." ***(Participant R)***

"I mean, if somebody is going to build a house, they're going to build a house. And I know that developers will say, "Oh, we won't be able to sell them". [referring to the option to improving specifications] Yeah, well if you cut your margins, you'll be able to sell them. They're still running about in their BMWs!" ***(Participant V)***

"…if you want to go for the more sustainable project or product or more insulation it costs more and also it... but I mean, at the end of the day it might cost less in the lifetime in the building." ***(Participant M)***

"…a balance for economic stuff would be initial costs versus your lifetime costs. So, it's about investing more into something because it is worthwhile doing." ***(Participant J)***

" There's been a few developers that we've worked with that have looked at various options and one maybe went for a town heating type system because there was going to be a financial benefit to them in the future because they would be monitoring for, you know, they'd be the factor for them. But from a developer's perspective it's down to the bottom line - they're not building it for themselves, so there's less interest in what the running costs are going to be." **(Participant K)**

Since many of the designers participating in this study also have experience working with commercial and non-domestic clients, this is one strand where it would be difficult to disentangle just how much of the designer' thinking is influenced more by either their domestic or non-domestic experiences. It is, however, still a factor that is considered in their domestic design work and, indeed, their acuity is likely enhanced where they have experience of non-domestic design projects. This strand shows that our designers are not only aware of the interactions between capital and operational expenditure options on the life of a building but it also shows the concern shown by

some participants that it is more than just about reducing overall 'cost' and there are wider, holistic, sustainability-oriented benefits to be gained, too.

In other research, Häkkinen and Belloni, (2011) identify higher investments costs compared with traditional buildings and the risks of unforeseen cost as a barrier to sustainable building and Heffernan *et al.* (2015) identify lower running costs as being a driver for zero carbon housebuilding alongside higher capital costs as being a significant barrier.

This Capex/Opex 'factor' is picked up specifically by Halliday (2008), looking at the cost factor of 'sustainable construction' , while it also discussed by Zapata-Lancaster and Tweed (2014) in their ethnographic study of energy regulation and Giesekam *et al.* (2015) where their study look at views on low carbon building materials.
In the Scottish context, Bros-Williamson *et al.* (2015) showed the energy demand for a house built to enhanced specification and costing approximately 10% more – built to Passivhaus standard[65] – to be significantly lower than for a conventional house (Although both houses in the study did actually use substantially more that was predicted)

Theme 2: Perceptions of the Building Standards

The story of this theme is unavoidably and intrinsically related to several aspects that have already been identified in the *Perceptions of Cost* theme. That is, the effect that the Building Standards are having on the 'product' – the final, designed and built output from the designer, including the technological components which they do or do not employ. There will be aspects of these various technological aspects that designers are faced with at different points in this theme, but we will return to this for a closer look in *Theme 3: Perceptions of Technology*

As has been considered in Chapter 2: *Context*, designers very often operate in the situation where sustainability i.e. what pertains to sustainability – is essentially defined

[65] It should be noted that throughout this chapter, and elsewhere in this thesis, that the spelling opted for this term is 'Passivhaus', rather than Passive House. This is for simplicity and consistency, although it is acknowledged that not all instances may be referring to the German certification system specifically and, additionally, there is no way of knowing. However, since a Passive House would essentially have to meet the standards of Passivhaus, the consistent spelling has been opted for.

for them and this is largely delivered via the Building Standards in Scotland. The Building Standards, and their specific requirements, under various elements deemed to fall under 'sustainability' represent a non-negotiable obstacle on the road to a successfully completed project. That is not to say that they don't know what other aspects of sustainability are – some certainly do, and some have demonstrated a great deal of insight into many other features of sustainability beyond what they must comply with in their day-today work.

That being said, we must be cognisant of the reality that when engaged in discussions around sustainability and the Building Standards with an architectural designer, there is an unavoidable gravitation to aspects within the specific curtilage of the Building Standards i.e. what the Standards themselves deem to fall under 'sustainability'.

Theme 2: Building Standards – Strand 1: Positive Improvements

"the Statutory Instruments are how you get change."

The first strand of this theme looks at the positive impact that the Building Standards are perceived to be having in driving improvements in the construction industry and, of course, particularly the issues in the Building Standards seen as *representing* 'sustainability' for them. When reflecting on the views that were offered with respect to the Building Standards generally, it is worth noting that in the coding exercise (and not just the quotes gathered for this strand), comments coded as specifically positive as opposed to those coded as being specifically negative were 3:2 across the whole cohort of participants – and while it should be remembered that numbers cannot be looked to in the same they would be in quantitative research – it is fair to say that when considering the interview interactions as a whole, there was generally a slightly more favourable disposition towards the Building Standards than against.

"…it forces people to be compliant, so in that respect, yeah, I think it is probably a good move. Because they are getting more stringent all the time and that can only be a good thing if it forces people to take… you know, sit up and make sure that they are thinking more inclusively" ***(Participant Q)***

"I guess without them as, as at least a backstop… then there probably would be a lot of things, particularly the cheap commercially driven stuff that actually would just go through that's absolute rubbish" ***(Participant H)***

"I think they have been quite effective, yeah […] we quite often find ourselves in a situation where with clients who don't have any sustainability agenda, that the building regulations provide a really, really useful backstop where we're able to say you just have to do this […] Em, and that convinces those clients where otherwise sometimes we wouldn't be able to push that argument, […] I find it useful to have a kind of set of standards to be referring back to."
(Participant I)

"I generally think it's a good starting point. Like, I think without it, it would be worse [laughs]. So, I think it's a positive thing and I think everything that they do within it is a positive thing. I think it's a catalyst for suppliers and somebody having […] to achieve these things because they just are the requirements therefore they will go ahead." ***(Participant J)***

"I think we have to have something in place because if we don't, developers are going to build what they've built 30 years ago. So they have to be forced into making changes and if that's a minimum standard, that's vastly improved on the 30 years ago, then that's not a bad thing […] but I would say they have to be led"
(Participant K)

"I'm a supporter. The world we live in, the nature of the world we live in and the increasing complexity available, in terms of construction and buildings, mean that an effective, regulatory regime is necessary - without doubt. […] the Statutory Instruments are how you get change." ***(Participant R)***

"I remember working with an English interior designer who thought it was completely crazy that our Regs stated how much water their taps were allowed to use but, you know, but actually it's quite important." ***(Participant H)***

"So I think, I think introducing it is the only way really to get people to have to deal with some of these things is to say "you must" and then that does help the industry. But the industry is it usually slightly behind that regulation."
(Participant J)

"…the people who are out there to just do the minimum that they can get away with doing - it's good in a way that there […] so they're not just gonna build something that's not doing anybody any good. At least it's gonna have achieved some sort of standard - a minimum standard of sustainability and energy performance"
(Participant P)

"what I'd actually like to see is that in a few years' time we don't actually talk about Passivhaus, eco-house, we're just, that's just taken as a given, that everything's designed to that standard and then we can talk about design again - about where a window should, about the joy, about the expression. And you just accept that every house is reaching that standard and I think that's a good thing about Building Regs that… OK, there's issues, there's problems, but eventually that standard should merge in with the aspirations of a Passivhaus."
(Participant S)

"They say that this is important, and this must be adhered to." ***(Participant M)***

"I feel they're an honest and realistic exercise, as they evolve. And they are always evolving." ***(Participant R)***

"If you don't have that - what you are you relying on to ensure that you, you know, environmentally, your buildings are addressing the fact that we shouldn't be wasting energy?" ***(Participant R)***

*"I mean, just in life I think, and people talk about the nanny state, but I think they're, just deluded. Unless you legislate for something, people don't do that. Thinking people will just do it off their own back is just nonsense. […]. And, so wherever you're trying to solve will not be solved."****(Participant V)***

"I think the only way that they will change is if they've got something the tell them they have to and the only thing that they have really, just now, is the Building Standards. So that kind of drives them all a little bit. Puts the prices up..." ***(Participant K)***

"If the legislation pushes them to reduce their emissions or reduce their… then that can only be a good thing" ***(Participant I)***

"without it… unless it's enforced - how would people who didn't... why would they, why would people, you know, unless they cared, why would… Some people, I mean developers and things wouldn't. They just want to throw things up as - not all - as cheaply as possible. And why would they be interested in putting more insulation in the walls if it's not embedded? […] So I think it's a good thing. I think the more onerous, I think is good and is better." ***(Participant W)***

*"…I see that - albeit that we tear our hair out at the stringency of the regulations - but that is really enlightened, developing government policy in, in greening the environment - in a very real way. It's boring, so the media don't really cover it. They're happier with their, you know, the stuff you see about global warming, windmills and all the rest of it."****(Participant R)***

We can see here that the appreciation for the Building Standards is apparent in a couple of different ways. First, is the notion that the Building Standards provide a 'backstop', and this is expressed several times across all the interviews. The Standards help to ensure, broadly, that minimum specification levels are adhered to i.e. 'at least it's gonna have achieved some sort of standard' but they also help prevent the industry from churning out buildings that are 'absolute rubbish'. Secondly, are the improvements that the Building Standards can help deliver as they become increasingly more stringent and evolve as part of what participant R calls 'an honest and realistic exercise'. Thirdly, is the positive reaction shown by several participants for the Building Standards being

used as an appropriate *vehicle* by which to deliver improvements, increasingly stringent standards and change to the industry.

Looking to similar themes being identified in the literature, Imrie (2007) highlights some problems that exist but also found a very similar, positive outlook from many respondents in their research – including the potential that exists for the Building Regulations to enhance quality in the built environment where clients would potentially be less inclined to enhance specification. Imrie also believes that his research shows that:

> *Far from being an insignificant part of the design process, as some commentators suggest… building regulations influence aspects of creative practice and process in architecture and, as such, ought to be given greater attention by scholars of urban design. (ibid)*

Similarly, Murtagh *et al.* (2016) finds that most designers in their work viewed regulation positively and, additionally, identified opportunities whereby designers can use the regulations to influence the client towards sustainability outcomes. Of course, while this generally observable positive view of the Standards will not be universally true across all designers, this is something that policy makers could potentially look to capitalise on. Indeed, it may even represent an opportunity for more radical and transformational development of the Standards to be successfully implemented than is currently expected or planned.

Theme 2: Building Standards – Strand 2: Problems

"It's a disaster – you can quote me on that!"

As indicated above, and as is probably to be expected, not *everybody* is necessarily enamoured with either the Building Standards and their prescriptions, or these Standards being the *vehicle* or *tool* to deliver sustainability outcomes in the construction industry. This following collection shows how these voices of dissent are sometimes expressed:

"I don't think they're particularly conducive to any kind of innovation, em, and that would go for sustainability as well..."
(Participant L)

"they're getting too big - they're too, too verbose, the regulations."
(Participant F)

"But at the moment we're caught in this halfway house of trying to be sustainable, trying to be energy conscious, but the Regs aren't tight enough to force people to do it. And the building industry will always take the cheap, shoddy solution to anything. That's what they do. And cost drives everything." ***(Participant A)***

"but I think sometimes the lines that they force you down… aren't necess… You spend all your time trying to comply with them rather than try to do it well."
(Participant E)

"so it's a kind of it's a one size fits all, it suits big developers and city centre locations, building big develops. It's not terribly flexible when you're dealing with rural locations or terribly sensible you know, or, dealing with existing buildings it can be incredibly stupid sometimes. […] It's a disaster - you can quote me on that! It's a disaster. One-size-fits-all approach is just nonsense."
(Participant B)

"…in some ways it makes you jump through hoops that aren't necessarily for a greater good. You're just jumping through a hoop or you might end up specifying a material that you've got to get from a ridiculous place because you can't achieve a rank - and then you're crossing three boxes by ticking one box."
(Participant J)

"…it probably limits people's aspirations for how sustainable they can be." ***(Participant P)***

"I think the emphasis is in a lot of wrong places, you know […] improvements in Section Six, I think, is questionable. Em, in terms of it being driven by a policy agenda rather than actually by somebody looking at it and seeing what's sensible, what's achievable and what's desirable. Because I think what it does, is it tends to... you can produce a building with Building Regulations that will satisfy all of Section Six and all Section Seven, you get a nice gold stamp at the end of it and it will not be a sustainable building."
(Participant B)

"So you can either have a completely leaky heat conservatory or you can have an extension that's only got windows that are that size [indicates very small sized window] You can't have anything in between, which is absolutely crazy."
(Participant B)

"The regulations themselves say nothing about the certification of the materials, so our specification goes out and it says all timber for must come from FSC certified sources - there's nothing in the Regulation about that. […] You could be bringing in the most unsustainable hardwood from Borneo throwing it up everywhere. The Building Regulations will say nothing about that." ***(Participant B)***

"…they see that that's what the standard is and they're then not going and pushing to improve and get further, you know[…] as opposed to going out and producing a building that's gonna be socially and environmentally sustainable like the perfect thing […] it probably limits people's aspirations for how sustainable they can be" ***(Participant E)***

"…there's some things in Building Standards that doesn't work sometimes as well. Em, and that's when you're working with existing buildings and everything else there's a lot of relaxations and everything else…" ***(Participant K)***

"In terms of the policy makers and the people who write the Standards, they are either being told a lot of nonsense or they're buying a lot of nonsense from big housing developers. A lot of Regulation these days are built to suit the big developers who invest a lot of time lobbying. And a lot of the stuff that is being produced isn't evidenced based."
(Participant B)

"So, you can build buildings that aren't sustainable, but get away with promoting them as sustainable and I think that's what part of the problem is - there's not a complete understanding of what sustainability is. […] I think a lot of the regulations are produced by people in offices who've never been on a building site."
(Participant B)

"…like for example, making an airtight building which you then have to put trickle vents in. So you have to then punch a whole load of holes through because... it's just back and forth sometimes a lot."
(Participant J)

So, while strand 1 shows us a level of appreciation held by some participants towards the Building Standards, this second strand offers views on some of the concerns that are held about the Building Standards' role in delivering sustainability outcomes. For some, this is expressed as a concern that the Standards are not yet robust enough to ensure quality, or quality assurance for the final 'product' and, therefore, allow for the inclusion of 'shoddy' solutions that may *technically* meet the minimum requirements. The perceived failure of the Standards to incentivise anything above achieving these minimum requirements is also cited as a concern. This seems to fit with the views expressed in our previous strand recognising the Standards as being in a continuing state of evolution and we will also see some of the issues around enhanced

specification reappear in Strand 5 of this theme. For other participants, their concerns are voiced as a perceived inflexibility in the Standards to deal with unusual or rural situations in particular and, further to this, that some features of the Standards actually undermine the delivery of sustainability objectives more broadly. Participant B is fairly forthright in expressing their concern that the Standards are not good enough and, indeed, feels that that they are written and developed by people who do not what they are doing while pondering that they may have 'never been on a building site'.

In other research, such as Imrie (2007) and Street (2007) there is similar identification of deficiencies in the Building Regulations and Imrie (ibid) also notes that building professionals do often identify Building Regulations as a 'burden'. In citing this research, Ross (2010) interprets the findings of Imrie (ibid) and Street (ibid), collectively, as demonstrating that architects are 'ambivalent about building regulation', but I don't think that this is a conclusion that I would agree with fully. While views are certainly *mixed*, I think it is fair to state that rather than being ambivalent, the designers participating in this research, generally, held clear and often decisive views on building regulation that can only have been developed through considerable deliberation in some cases.

Theme 2: Building Standards – Strand 3: Differences

In this third strand under the theme *Building Standards*, which I have called *Differences* there will be two collections, to help separate the views expressed around two inter-related aspects. First, there is a collection demonstrating perceptions of the differences that can exist *within* different private housing types – essentially one-off dwellings and private, volume housing – and, secondly, perceptions of the differences that exist *between* private and public or social housing which, broadly, may be seen as the differences between two types of volume housebuilding.

Strand 3(a) – Differences Within

"it's all about making money for developers. It's not about providing houses for people"

"…in terms of building fabric and insulation and most of the kind of standard detailing that we use complies easily anyway."
(Participant I)

"People are going to achieve what you need to achieve or they're going to exceed it because they want to do something special themselves."
(Participant K)

"That wouldn't enter into a discussion with a private client. Generally, because they are probably building to higher quality anyway. Most one-off houses, they would be going for a renewable heat source anyway. So you're easily going to meet the Regs." ***(Participant A)***

"we would always approach it from a perspective where we want to encourage something that was a little bit different from the normal mass-produced housing - which just looks like spaghetti thrown onto a map…" ***(Participant K)***

"You've got your bespoke domestic market, you've got your developers. Developers were going to hit the target." ***(Participant K)***

"I'm more against the private house builders building the shoddy boxes that you see all over the country because they are building cheap but selling dear. […] I'm more against that, but that's the free market. If you build rubbish and people buy it, then who am I to say anything?"
(Participant A)

"…most one-off houses, I would say, above a certain limit or a certain budget… They are looking to do most of, certainly renewables, eh, but that they're also thinking in terms of wider sustainability too, I would say. Um, particularly in the rural areas."
(Participant A)

"And they've got it down to a fine art, you know, every bit of material in each of their houses is calculated to the nth degree to meet of the regulations… just - To maximize their profit, and to essentially give the consumer the minimum for the ridiculous prices they can get away with." ***(Participant R)***

[with reference to the volume housebuilding 'industry'] "…the problem is, and I understand why they have to gradually incremental improvement. But the downside of that is you allow the industry sufficient time to give you cheap, shoddy solutions that meet the Regs."
(Participant A)

"…but generally, the projects we work on are commercially driven and will be pulled back to requirements of the Technical Standards rather than going further than that."
(Participant E)

"It may be that our buildings shouldn't look anything like they do at the moment. Particularly houses. Particularly some of the mass houses because they have no relationship to local environments and location and orientation. It's all case of putting a box on a map, on a plan."
(Participant N)

"We didn't do mass housing for a really long time because it's been driven by the developer and until recently that's been, you know, that's a parcel of land and just get as many houses on that as you possibly can and that's the house type that you're using. End of. So we backed away from that market, until maybe a few years ago and we started getting involved again because people were starting to push a little bit more towards what's referred to as 'New Urbanism'" ***(Participant K)***

"We, as a practice do, don't do a huge percentage of "mass housing" if you want to put it that way. And a large percentage of mass housing isn't done by architects anyway."
(Participant R)

"…just how the housing market in this country is set up, and it's all about making money for developers. It's not about providing houses for people. Em, the whole land banking policy of a lot of developers means that individuals who would have more of a ... an individual building, his own house, have more of a desire to provide something that is more sustainable - socially, economically, environmentally. Something he's going to invest in. Land's not available to them, which is disappointing." ***(Participant N)***

"From a bespoke housing market that doesn't matter because they're looking for something special anyway." ***(Participant K)***

[referring to volume housing] "You're not gonna meet your social aspect of it. You're gonna maybe meet the Building Standards requirements where you've got bronze-level everywhere but the actual infrastructure and everything else that goes with it, hasn't been improved. So you're not really improving that side of it."
(Participant K)

"…the reality is the majority of buildings in the country is volume house builders, social housing, and if there weren't standards, they'd just build what they like" ***(Participant U)***

"A lot of residential housing providers, and I'm talking here about commercial mass housing providers. They're only concerned with, with the financial side of things. I don't think they have any concern about the social aspects of their work. And the sustainable side is purely a case of ticking boxes to get the permissions. If there are some then, they're very far and few between - who look at the overall interactions in all these things." ***(Participant N)***

"…a kit house or a housing development. Copy-paste, copy-paste, house-type, pull across. And somehow people still think they're great and want to go and live there. I don't think that's helping the image of an architect. It's those sort of housing developments... because I know I look at them and go like 'Why? Why?' It could be so much nicer..."
(Participant P)

"Now, I think the problem is and the volume house builders are obviously perceived as the saviours because they're the ones that can finance it and deliver it etc. And to a greater or lesser extent, they're allowed to build crap. Yes, they meet the building regs etc but I think in terms of the housing shortage, it's got to be in the hands of the volume builders. But I think there has to be a way of, kind of, improving the design agenda." ***(Participant U)***

For private, 'one-off' dwellings there is a clear perception that the sustainability prescriptions of the Building Standards almost always have very little bearing on design outcomes – and certainly with respect to what would be viewed as 'enhancements' to specification. It has been clearly expressed here that such houses will have little trouble meeting and exceeding the sustainability requirements of the

Building Standards since such clients *may* be less constrained by budget and are often seeking 'something special'.

Private, one-off housing, of course, is not where the bulk of house building is delivered in the private sector. It is, of course in the commercial 'volume' or 'mass' house building portion of the market, and this has already been noted and discussed in Chapter 2: *Context and a Review of the Literature.* For volume, commercial, housebuilding the Building Standards are seen as having a very different effect, not only on the material specification relating to sustainability but also, it should be noted, on the design. Our participants here reflect on what they see as the prevalent features of this volume housebuilding as 'crap' and 'shoddy boxes', offering poor value for money, that are specifically intended to meet the requirements and avoid *any* cost inducing improvements over and above this level. More broadly than this, it is noted that architects seem to have a diminished role in this area of the sector – as we will see in more detail in Theme 4, below – and that such commercially driven volume housebuilding is less likely to positively add to the social aspects that might be perceived as being a key component to delivering 'sustainable' dwellings in this context

Beyond this, there is the potential for a glint of hope offered via 'New urbanism' – a development in the industry that Participant K identifies as being responsible for his firm's decision to reconsider their previous unwillingness to design for commercial developments.

Somewhat similar contrasts are identified by Heffernan *et al.* (2015) in their research into low and zero carbon housing which identified 'industry' barriers and differences between the volume and non-volume housebuilding market. They point to an over-reliance in the UK on volume housebuilding, causing a lack of diversity and failure to provide 'homes that meet the occupants' needs' They contrast their findings with that of Osmani and O'Reilly (2009) who did not identify such 'industry' barriers – which is likely down to Osmani and O'Reilly investigation the views and perceptions of (volume) housebuilders alone.

It is interesting, too, to note the comments of Participant K, who sees hope for volume housing building in what is offered by 'New Urbanism' and the incorporation of more social sustainability factors. This appears to be a relatively new field in sustainability research but is considered in detail by Woodcraft (2015) in their work looking at understanding and measuring social sustainability.

Strand 3(b) – Differences Between

"Social housing is now of a far higher quality than commercial housing"

[referring to the approach taken in Local Authority design work] "I think we were always trying to better the building regs to sort of almost future-proof in a sense, any change in Regs." ***(Participant P)***

"Social housing is now of a far higher quality than commercial housing, because they have to comply with a lot of stuff that the [Construction Firm Name]*'s of the world don't have to. The biggest necessary revolution has to be in social housing provision."* ***(Participant R)***

"Well, the ones that do have more input, and probably do have a definite wish to have a more sustainable approach to their processes are housing associations - only because it's on their portfolio. So, again, they'll go down this eco-minimalism route as far as they can because there's a maintenance thing as well, but they'll be a lot more open to a sustainable type design approach because there'll be a financial benefit to them in the future." ***(Participant H)***

[Referring to Local Authority work] "Basically, we're given a site and told that this is, um, yeah, we've just to develop it, you know. So I don't know how they are selecting sites." ***(Participant W)***

"I think Local Authorities are recognising that and requiring a bit more that more than just the provision of numbers when it comes to housing. They require, you know, that social side of things, cultural side of things, which hasn't been there for quite a while." ***(Participant N)***

"I mean, you know, I'd much rather live in a [private architect, known for high quality on-off housing] *house that a Council box! So, you know, for various reasons it's the materials it's built with, it's the spaces that are created, you know, the spaces within that relate to other people. I don't see why we can't take some of that across to these housing schemes."* ***(Participant W)***

"Em, building houses for a Local Authority, em, that's what I'd like to do, contribute to society and obviously we're building houses, but they're not the type of houses, ideally in the real world or the kind of places that I would..." ***(Participant W)***

"The persons that probably don't participate as much as you would hope they would participate, are the actual clients or - particularly public-sector clients. And that's, I'm not sure why that is but it is perhaps because the client or the clients' representative is not actually the end user and it's the end user that needs to understand how the design is put together on how he wants the design put together in how the building works." ***(Participant D)***

"We do a lot of, of social housing and you have your benchmark figures you need to achieve. And it's all about achieving that and, eh, rather than doing the enhanced thing… But maybe the enhanced Silver, Gold, Platinum will eventually become a Bronze level or they will get bumped up so you... they do become... these do become the backstop as these Standards become more onerous." ***(Participant E)***

Secondly, here, is what was offered in participants in terms of what they perceived as the differences *between* publicly and private funded dwellings. The relationship here between this strand and the identified Theme of *Building Standards* is almost incidental, but they do arise out of broader discussion around the Building Standards and this is a useful place to situate these perceptions, nonetheless.

Several participants in this research have worked, to varying degrees, on projects for private housebuilders, volume housebuilders, Local Authority and Housing Associations at some point in the professional career and this helps provide for a more informed 'outsider' perspective. It is felt by several participants that these publicly funded, volume housebuilders certainly have more of a vested interest in enhancing sustainability-related specification. This includes the running costs of the dwelling, owing to the different ownership model that these dwellings fall under and, of course, the associated 'Capex' and 'Opex' elements that we have seen in the previous theme – which have their own particular outworking in publicly funded and managed housing.

However, it is important to note that three of the our selected comments in this collection are from Participant W, who is *currently* an architect for a Local Authority, and their comments do indicate that – despite the differing conditions that are sometimes present – there is in a slightly more constrained approach forced upon them. In a somewhat downbeat tone, which was noticeably present throughout the interview with Participant W, there is clearly a feeling of disenfranchisement and creative design curtailment. While it is not the place of this research to investigate what other factors might working here, it is nonetheless interesting to note.

This is obviously a particularly nuanced strand in this Theme and therefore it is not expected to be particularly prevalent in the literature. There is also the added factor of being highly context specific – not just to the UK – but also to Scotland, where particular regulation and operational frameworks exist.

Aside from this, Bros-Williamson *et al.* (2015) do provide evidence to support that some Housing Associations are trying to 'future-proof' their homes, as a deliberate and determined approach, with enhanced specification for energy performance. This can be placed in contrast to the Local Authority designers in *this* study who are often not able to attempt exceeding regulatory prescriptions due to a combination of different constraints that they are operating under. Finally, McManus *et al.* (2010) also discuss some noted difference between social and private housing aspects that closely relate to what has been identified in this research, although it should be noted that this specifically related to research on the now defunct Code for Sustainable Homes scheme.

Theme 2: Building Standards – Strand 4: Energy and CO_2?
"They've got just a bit obsessed with it"

The Fourth strand in this theme comprises general observations about the focus of the Building Standards, reflected in what is seen by our participants as an over-emphasis on Energy and CO_2 in the Building Standards. This is moving away from any premise that the Building Standards, as they are currently prescribed, provide a *de facto* 'definition' of sustainability for the designer in the context of their everyday work and is moving towards exploring the designer's own critical reflection on what the Standards *should* prescribe as being included under sustainability, how that should be balanced and what it demands of them and their design.

"I think this whole CO_2 thing is just bunk really […] there's no harm in improving emissions from cars and things like that but, em, I think this whole concept that human beings are the baddies from the point of view of producing CO_2 is a load of bumf really, just tosh." ***(Participant F)***

"And, again, the sustainability agenda gets reduced down to carbon dioxide emissions, and is all anybody seems to understand is carbon dioxide emissions and that is a vast, vast, vast, oversimplification and it's completely distorted all of the policy making and the Building Regulation […] Whatever is written in the Regulations we've got to comply with, whether it's a load of nonsense or not." ***(Participant B)***

"… the whole energy efficiency thing in the regulations is a lot of nonsense, because they are totally focused on the thermal efficiency of the building fabric." ***(Participant B)***

[Referring to an overemphasis in the Building Standards on CO_2] "They've got just a bit obsessed with it and, eh, it's a bit em, skewed and it's not properly thought out at all."
(Participant F)

"the focus of it is all on carbon emissions and building fabric but the calculations don't add up. So, there's no correlation between what the building actually uses in terms of carbon and what the building regulations calculate it as being."
(Participant B)

"Sustainability just becomes purely about energy performance and then maybe they're not thinking about how what they're producing can affect sort of the wider reaches of where it is and what I can do."
(Participant P)

"It's very easy to get caught up was just measuring it as energy consumption or even narrower as carbon dioxide emissions or whatever. Which is a bizarre one. I remember doing stuff at school and, you know, it was all about reducing other types of pollution and whereas now it seems that focuses purely on Carbon Dioxide and who cares how else you destroy the world."
(Participant H)

"…perhaps the Technical Standards does focus very much on the energy side of, emissions side of sustainability rather than the responsible sourcing of materials… […] it is much, much energy, emissions based rather than the, the more broader picture of sustainability and that longevity of buildings and the usability of our buildings and the sourcing of particular materials… yes!"
(Participant E)

"Yeah, it's so much of it is CO_2 and thermal performance and how much we're pumping into heating a space - as opposed to - why are we not looking at like a minimum of a solar gain." ***(Participant P)***

"Are we using less energy, well we should be using less energy but that's only if the person uses the house as it was designed to be used. Doesn't sleep with his windows open…"
(Participant D)

"Because the whole process is focused on energy performance. So the likes of where materials are coming from isn't specified." ***(Participant B)***

"All anybody ever talks about is carbon reduction. You can't distinguish yourself in the market as being ecological or sustainable."
(Participant B)

"I'm not sure if it's necessarily attempting to measure the right things anyway. I think it's probably doing the thing of measuring the things that are easy to measure."
(Participant H)

From this collection, we can see that for some of our designers the emphasis on Energy and CO_2 prescriptions in the Building Standards are a clear problem. This collection is dominated to some degree by one participant and it is undoubtedly a feature of the Standards that puzzles Participant B – but their views should not be discounted just because they appear to have a 'bee in their bonnet' about it. Similarly, while participant F would possibly fall into the camp of 'climate denier', their perceptions should not be dismissed either. Crucially, as far as the comments offered by Participant B are concerned, there are similar views expressed by other participants, and the criticism levelled at the emphasis on energy and CO_2 in the Standards does attempt to be constructive in places, too. From the other participants we are provided with suggestions that the Building Standards should have increased emphasis on longevity, usability, responsible sourcing of materials and also more consideration of the occupied phase of the dwelling's life to assess and better understand how the 'in use' measurements compare to the theoretical, calculated measurements for energy and CO_2.

Although situated in a very different social and construction 'culture, this is also a theme picked up Hagbert and Femenías (2016) who concluded in their study of a Swedish residential development that the (over) emphasis seen there on energy-efficient buildings had not concurrently led to broader or more holistic sustainability goals. Meanwhile, Gibbs and O'Neill (2015) note that, in their estimation, the UK government have deliberately interpreted 'green building' in terms of 'mainstreaming' energy and CO_2 reduction as part of a low carbon agenda that aims to gain particular economic benefits by doing so.

More broadly, of course, this is thoroughly considered by both Shove (2018) and Galvin (2016), as the issues identified in this strand are part of the broader 'energy efficiency' discourse and downstream effects with performance gaps such as the 'rebound effect' that were also noted in Chapter 2 of this research.

This strand clearly demonstrates some pressing challenges that may exist for the industry, policy makers and educators in delivering sustainability under current arrangements. If there is a wide-spread perception that sustainability is all just about CO_2 and energy - and if standards, regulations and policies are reinforcing that

misconception, then there may yet be some way to go to ensure that lessons are being learned in how best to develop, disseminate and educate on policy and regulation changes in the future. Further to this, some care may also need to be taken if the effects of diminishing returns do take hold for specification enhancements directed towards CO_2 and energy and the focus shift to increasing performance in other areas covered by the Building Standards, for example.

Theme 2: Building Standards – Strand 5: Enhanced Levels

"…my experience has always been the whatever complies is good enough"

The fifth and final strand of this theme tells us of the perceptions held about the *enhanced* levels achievement attainable under the Scottish Building Standards.
As has already been outlined in Chapter 2, under the Domestic Building Standards in Scotland, a project is awarded a Bronze level of achievement upon fulfilling the requirements laid out in the Standards (Sections 1-6). Above that, there are various additional measures that may be applied to the dwelling that offer the opportunity of being awarded a higher level of achievement – as was discussed in Chapter 2: *Context*.

"well I've never, ever had a client say "we want to achieve a silver active or gold or… Never […] And my experience has always been the whatever complies is good enough. [For the client]" ***(Participant L)***

"If I was gonna buy a new house and there was one that was "A" rated and one that was "C" rated and they're exactly the same house apart from this - I actually think surveyors would price them the same. They'd be the same value. So, I think, you know, they're trying to give people a certificate that says say "this building's better than any other building" but I think what it comes down to is the marketplace. I don't think is a massive influence."
(Participant L)

"I think if those levels, particularly when it comes to new build, mass housing, if those levels of sustainability and the energy use levels were more visible as part of the selling, and sales process then, they might have more influence in that direction." ***(Participant N)***

"You know, I think every time they come out with a new, a new minimum you just figure out a way of achieving it and then that's how you do it from then on until they come out with a new minimum. Because, yeah, and actually I've always found that when you go into a new house that's been designed to, to just achieve the minimum, the client's telling you 'I haven't had the heating on for a year' "
(Participant L)

" It's always been tagged on the end of the main bulk of things you need to know - as something to keep in mind, or to keep driving forward or just to, you know... but it's never been central to the argument or never been, like the client coming and saying 'I want to achieve Gold but I'm not bothered about how much it's going to cost' or 'I'm not bothered about how much space it takes up' or… it doesn't form the main part of the brief." ***(Participant G)***

"No, a client's never asked for one, I've never applied for one […] We did some studies on it to see what the requirements would be to build a house to the Gold Standard a few years ago. Just as a research project. It wasn't particularly difficult to achieve. All you needed to provide was the storage requirement for the mobility buggy thing." ***(Participant B)***

"I don't know of anybody that actually has adopted the gold standard. I've never seen in any marketing literature for any housing development."
(Participant B)

"I keep going back to insulation level, but it's a good example in that you used to be able to achieve minimum standards, with a certain thickness of insulation and then when they moved on the standards you had to basically double the levels of insulation. There will probably come a point where you'll need a treble that and then there'll come a point where it's pointless adding any more." ***(Participant N)***

"I think, having gone through the Section Seven thing, it turns into a game though. On the basis that you need to get a number out the end of the process. And it's a case of 'try that, no, take that back out. Try that. What number does that give us? What about if we put in a such-and-such?' And it's pretty much just playing number games."
(Participant U)

"So I can't give you a straight answer – 'yeah it's coming for our clients there's a huge demand for it' – There isn't. My perception is there isn't." ***(Participant R)***

As this collection demonstrates, when discussing these enhanced levels available under the Scottish Building Standards, there is seldom a positive word to be said for them. It doesn't just seem to be that our designers aren't interested in these higher standards, but that they actually appear to be quite *dismissive* of them. For Participant U, it's just a 'numbers game' and Participant B already considers that they are designing to an enhanced level but does not seek the certification. Across the rest of our contributors, there are indicators that there is no perceived value in attaining the enhanced levels and this would appear to be for two reasons. First, is that these enhanced *are not*, and currently *will not* be reflected in the market value of a dwelling. Secondly, there is a perception of a diminishing return, whereby the current levels of insulation are already delivering dwellings with incredibly low heat loads, for example, and they see no need

of going beyond 'whatever complies' to attempt to reduce this further. There is an interesting parallel here, to what we saw in the previous strand where the consistent emphasis on energy and CO_2 measures may now start to see their impact plateauing. There is also a noteworthy contrast here to the broad feeling of 'more sustainability is better' in Strand 1 of this theme but, again the lack of enthusiasm here may be linked to the aspects that receive the most attention in order to achieve these enhanced levels. This is another strand where there is not much to be found in the literature that would specifically support or contradict what has been identified here – and certainly not in the context of the Scottish Building Standards and their enhanced levels. Since the Scottish Standards are still relatively recent in their inception, it may be that this type of research will emerge in the future. In the work by Murtagh *et al.* (2016) – which specifically relates to the 'higher' levels obtained under BREEAM i.e. non-domestic certification schemes, it is interesting that they identified that the higher levels offered there also 'appeared to be a largely ineffective extrinsic motivator' (ibid).

Theme 3: Perceptions of Technology

The third theme that we will look at is, again, a multi-stranded story of the different ways that conceive of technology being involved in the design and delivery of dwellings in Scotland. There is overlap here, too, with the previous themes of Building Standards and Cost and I feel that this further demonstrates the level of complexity of what we are considering in this research and how unavoidably interconnected and intertwined these factors are.

This is a story of this theme is partly a glimpse into of appropriate our designers feel it is to 'solve' or meet sustainability outcomes with technology – a concept that we have already visited in Chapter 2: Context, and one to which we will return in the Conclusions. Further to this, the strands in this theme provide insight into views of renewables, the in-use factors of usability and, lastly, a collection that provides some representative examples of the levels of scepticism held by some of our participants with respect to the use of technology in buildings.

Theme 3: Technology – Strand 1: Fabric First?

"I don't like 'eco bling'. Fabric first"

In the first strand of this Theme we will see that the notion of 'fabric first' emerge as a crucial component of the design philosophy of several of our participants. Fabric first is not something that was specifically considered in any depth in Chapter 2: *Context* , although it is mentioned in several of the sources drawn upon in that chapter and appears to be at the level of 'first principles' for some participants as the means of reducing the heat loads in a dwelling and embedding *passive* means of operation.

"'fabric first' is the other general approach. So we want to ...any money goes into the fabric rather than add-ons, which might cause additional maintenance charges and stuff that might have to be replaced in the future."
(Participant V)

"I mean, I'm a kinda 'fabric first' type designer, I would say. So I'm always looking at how the thermal envelope performs, em, rather than 'plug-in' technologies that can offset things. So, a marker of design for me, I tend to try and push or not push, but influence insulation choices and things like that more than trying to, I suppose, introduce technologies, yeah." ***(Participant L)***

"…it needs to be in the building fabric. The bolt on systems will need replaced in twenty years or less. Um so you need your building to be efficient to start off."
(Participant H)

"… I mean, I'm definitely trying to take forward a 'fabric first' approach and I think they all seem to think that's what people want. But obviously there's costs associated with that."
(Participant W)

So our approach is "fabric first" Our preference is to use an unprocessed material. […] So, stone, timber - things that people can adapt and change and repair themselves. Then we like to use insulation properly and ventilation properly. If we need to do more, we like to keep it as simple as possible."
(Participant B)

"You get a lot of clients coming in to say, 'I want ground source or air source, I want a wind turbine, I want photovoltaic and I want the hot water panels in the roof.' And I will try and talk them out of all of them. Because as a Passivhaus designer I don't like 'eco bling'. Fabric first. Now that's passive - basically building. You design the fabric so there is no heat load, then it doesn't matter what you use, you can use anything you like because you'll only use a tiny amount a year. Except water heating because that's the biggest heat load there is in a well-designed Passivhaus."
(Participant A)

"I think from our point of view of sustainability, we like a 'fabric first' approach so if the fabric of our buildings are robust and the client know how to maintain them, then that's the first box ticked." ***(Participant S)***

I mean, I'm a kinda 'fabric first' type designer, I would say. So I'm always looking at how the thermal envelope performs, em, rather than 'plug-in' technologies that can offset things. So, a marker of design for me, I tend to try and push or not push, but influence insulation choices and things like that more than trying to, I suppose, introduce technologies, yeah." ***(Participant L)***

What we see in this collection is the notion that 'fabric first' is a means of not only reducing the requirements of a dwelling for a space heating via 'technology' i.e. 'minimising heat loss by prioritising insulation and air-tightness before generating more efficient heat' (Gupta *et al.*, 2015) , but also a means of keeping the building simple to operate, maintain and construct by investing in appropriately specified materials. We will look further into 'usability' in a following strand but it is interesting to note that there is a general disaffection for 'bolt-on' technology or 'eco-bling', too since the successful means of attaining a 'passive' building as conceived here, potentially seems to rely on the application of such technology, and we will see this more of this possible dichotomy in the next strand.

As was indicated in Chapter 1: *Introduction*, after the interviews were completed and while data analysis was taking place, a detailed discussion was held with John Brennan, Senior Lecturer in the Edinburgh School of Architecture and Landscape Architecture, and some of the talking points from the interviews were discussed with him. Around the notion of 'fabric first', it is interesting to note that his view of the approach was that of the 'last' generation of architects and isn't necessarily a design philosophy that would be instilled in the current generation of architecture students. It was also noted that building services engineers tend not to like the approach as it makes the task of designing and specifying such systems more difficult, although it is not clear if this factor is a driver towards other design philosophies.

Although there is much discussion in the literature about building fabric and how this implicitly relates to sustainability and design and construction outcomes, the design 'philosophy' of fabric first itself does not seem to be something that get much explicit

attention. Mcleod *et al.* (2012) conclude that fabric first is a robust method for achieving greenhouse gas (GHG) emission targets in the long term for the UK while also helping to avoid 'extensive use for carbon offsetting mechanisms' and additionally, Heffernan *et al.* 2015) suggest that 'fabric first' approaches would appear to be most cost optimal compared to full Passivhaus standards. Grover *et al.* (2019), looking at architectural practice in the UK pick up on the use of the 'fabric first' approach as being a 'primary' means of achieving sustainable architecture and. Similarly, Ò'Riain *et al.* (2016), looking particularly at low carbon retrofit scenarios, point to 'fabric first' as being an important intervention for the reduction of energy demand and extending the lifespan of a building. They also identify the emerging issue of designers having to choose between *active* and *passive* strategies – which we will look at in the following strand – and that proposed approaches (in Ireland) may be driving designers away from 'fabric first' approaches due to a perceived cost saving potential.
In the Scottish context specifically, the 2013 update to the 2007 'Sullivan Report' (Scottish Ministers and Sullivan, 2013), which was introduced in Chapter 2: *Context,* does explicitly mention the aim and aspiration for a 'fabric first' approach to reduce energy demand in conjunction with an advocation to use 'simple solutions rather than 'layering' of complex technologies.'

Theme 3: Technology – Strand 2: Airtightness and Ventilation

"I think that's just nonsense. I think that somebody's got that badly wrong."

In this strand we will see a collection of views that, in many ways, builds upon the concepts raised in the previous strand, where some of the consequential design choices are highlighted in relation to the airtightness of a dwelling and how our participants feel about how ventilation is managed. This is also where we begin to see the beginnings of a potential conflict of design philosophies emerging, depending on the ultimate route that is taken for the Building Standards in Scotland.

"Whereas designing a building where you get good natural cross ventilation in the building [...] lots of Sun coming in - all of which kill, kill bugs, you know, that type of thing. So that kind of principle would work a lot better." ***(Participant F)***

"...we've put in all these elaborate heat recovery systems etc. Well, they only work if somebody changes the filters every year or whenever they're meant to be changed. Do the housing providers go round and change the filters in these houses every year? Who knows." ***(Participant D)***

"But for instance, the regulations are driving us towards the Scandinavian solution - which is very, very well insulated airtight buildings. But because of the condensation, you have whole house ventilation with heat recovery. Now, that's passive, basically. Our regulations attempted to force us down that route, but they stopped short because they're trying to do incremental improvement." ***(Participant A)***

"apart from the fact that they've shied, we from forcing us down the whole house ventilation route - I think that's a mistake - but I can understand why they've done it." ***(Participant A)***

"They were quite heavy into whole house MVHR but when I first came here [Local Authority], we put an intelligent passive vent into some terraced houses - which is a natural system that just works well. Passive stack. And they're not keen on MVHR much anymore - because it's not cost effective. There's mechanics, things can go wrong, blah, blah, blah" ***(Participant W)***

"I don't agree with air tightness - I think that's just nonsense. I think that somebody's got that badly wrong. […]and I think this whole air tightness thing in buildings, discouraging good ventilation but only ventilation through ducted systems, em, is not good for health and I wouldn't go for… I'm fighting this one strongly(!) Opening windows are good… you know, really!" ***(Participant F)***

"As soon as you start getting into heat pumps and heat recovery ventilation systems. Kind of more complex technology, there's so many more things can go wrong. And if the whole health of the building relies on technology then you're kinda creating a vulnerable situation and sometimes of technology doesn't work. It doesn't do what it says. And there are plenty of examples of that, where the technology has gone wrong." ***(Participant B)***

"houses now have fairly, or sometimes over sophisticated systems of heating or ventilation" ***(Participant D)***

"I think we should have made it compulsively that you had whole house ventilation with heat recovery." ***(Participant A)***

"You've got to look at, kind of, what is healthy in terms of a lifestyle. You can't have people living in sealed boxes. It's not healthy. You need to allow fresh air and in building, you need to allow people to open a window. As soon as somebody opens a window that's all your calculations out the window! [laughs] They go with it out the window!" ***(Participant B)***

"… we try to talk them out of the 'eco bling' and try to talk them into putting everything into the insulation of the house, the air tightness of the house. Ideally whole house ventilation with heat recovery, which is the big stumbling block because we can't get people to do that. But that's a massive thing. I mean, you couldn't have a passive house that didn't have heat recovery." ***(Participant A)***

"they want to achieve all the carbon reductions in what is effectively only causing a third of the building's problems. But if you look at the fabric heat loss, you've got to look at, not only the thermal transmission but also the ventilation of the houses. So, in a modern thermally efficient building, only half of that heat loss is through the walls and the roof and the windows. Half of it is just through natural ventilation and air changes - which you need to keep the building healthy. […] So every year they come up with higher and higher and higher and higher efficiency requirements for the building fabric and then they wonder why they are not hitting that carbon reduction targets." ***(Participant B)***

"for example, an extract fan provides 30 litres per second air changes in a factory in Milton Keynes, installed correctly. You take it to Glasgow, the guys blootered a whole in a wall with whatever he happened to have to the hand because he didn't actually have a core cutter. He's put the fan in, it's is running slightly back on itself so there's moisture running back into the fan. Its full of dust because it's not been protected. And, therefore, in actual fact, it's only getting so many... the standards just don't deal with that ***at all****."* ***(Participant U)***

"Do I like the idea of everything being hermetically sealed and fans running all the time? I'm not sure I necessarily do, to be honest." ***(Participant U)***

"I don't mind mechanical ventilation but provided there's not too much ductwork involved." ***(Participant F)***

"I think that the danger is about the ventilation, which, you know, making the houses tighter. […] For constant ventilation […] when you go back to look at defects, you see that people have put tape over the vent fans. Em, so it's difficult... and even if you've told them this was going to cost you two pounds a year to keep this fan running. It's just the perception that this is costing them money and is making the house cold but it's keeping the house healthy." ***(Participant V)***

"well we've, we've gone down this route of making houses particularly airtight, eh, but we will wait and see if in 30 years' time if that is still the same philosophy and we don't know what this airtightness is going to do, do we? Why can't a person…We design these houses to be airtight and the first thing you want to do, and I'm sure we're all the same, is perhaps open a window, leave a door open, leave that door open, leave that door open, but that's not the way these houses are designed to work. So we have invested lots and lots of money in these houses, making them more energy efficient, eh, trying to reduce waste of materials, etc, etc, etc but what has been the real benefit to the person that actually occupies the house?" ***(Participant D)***

"But if you design your building properly, it's got proper orientation, it's got proper natural ventilation it's well insulated, you've got air tightness to a proper degree... […] …You know, it's all very well having a really airtight building, but it doesn't work unless you put in a really good ventilation system, so then you start from a heat recovery again and then you're starting to add stuff on to that" ***(Participant K)***

"I'm probably not particularly knowledgeable about sustainable technologies so a lot of my own appreciation of sustainability, I would call kind of an 'old-school' sustainability would be to do with how massing and things like that affect temperature and how the kind of natural ventilation […] I'm more of an old school version than the high-tech version and that's probably a natural comfortability for me - is where I prefer to sit [laughs]" **(Participant J)**

What is obvious from this collection is that there are two schools of thought operating with respect to the airtightness and ventilation options for a building – and possibly even three, although it may be difficult to deduce whether the three would disentangle cleanly on closer inspection of the examples we have in this collection. On the one hand, there is a clear distrust or dislike amongst some of the participants for dwellings that are highly airtight, and this is expressed in terms of the wellbeing and air *quality* for the occupants, the comfort of having ready access to 'fresh air'. Secondly is the view – with a particular evangelist in Participant A – that the current Building standards do not yet require a high enough level or airtightness. This is coupled with the view that the Building Standards should, and will, ultimately settle upon a level of airtightness that is effectively the same as that which is required by Passivhaus, a particular approach that was outlined briefly in Chapter 2: Context and which, ultimately, cannot be achieved without the aid of a mechanical ventilation strategy.. The potential third view is not quite in-between, but is fairly clear from the views expressed here. This is where there is maybe the tacit acceptance that the airtightness levels prescribed are acceptable or, at least unavoidable, but the methods used to combat the consequential condensation and ventilation issues are not acceptable. Namely, the sub-optimal application of constant ventilation via extract fans or the application of ventilation systems that employ 'over sophisticated or 'elaborate' heat recovery systems that rely on potentially expensive and unreliable mechanical plant to be effective.

Both Davies and Oreszczyn (2012) and Shrubsole *et al.* (2014), who identify the unintended consequences of decarbonising and improving the energy efficiency of UK

housing stock respectively, identify the specific problem of indoor air quality, related to increased levels in airtightness – both in terms of air 'changes' and the extent to which air quality can be inadvertently reduced, resulting in various health-related consequences. Davies and Oreszczyn build on previous work by Wargocki (2013), who found that natural ventilation systems seemed to work just as well as mechanical ones and also showed that older mechanical systems performed poorly compared to new ones, citing significant issues, and evidence, of systems not being maintained properly. Conversely, in partial contrast to this and some of the comments from our participants, Crawley *et al.* (2019) indicate that it is naturally ventilated dwellings that may suffer most from poor air quality issues but do also raise concerns that the current regulation and design strategy around airtightness and ventilation are sub-optimal and need to evolve further to realise CO_2, cost and air quality benefits.
Looking at post-occupancy evaluation of social housing built to different levels of enhanced specification, Pretlove and Kade (2016), note that occupants also did not know how to use or maintain the MVHR systems in their homes, which would presumably compound the issues that have been identified here. In the Scottish context, Sharpe *et al.* (2018) look at aspects highlighted in this strand specifically in Scotland. They note that the in-use realities of an occupied dwelling potentially do not meet design targets and identify challenges that will need to be faced if Mechanical Heat Recovery and Ventilation (MHRV) is to become a widely adopted practice.

As has been noted in other strands, this, too, presents a challenge for both the education or professional development element of an evolving set of Standards and also the direction of travel that future development takes. Where misconceptions or misunderstandings exist – on either side of what has been expressed here – these must be identified, and clear and explicit guidance provided. It is vital, therefore, that more is done to prevent issues such as those expressed in this strand becoming much more entrenched and difficult to deal with as requirements (presumably) become more stringent and the direction is set.

Theme 3: Technology – Strand 3: Renewables

"the architectural short-cut to minimizing energy and energy conservation"

In this third strand we have a collection of views offered around the application of technological 'solutions' into a dwelling, primarily with reference to their use for space and water heating.

"You'll get a client who comes in, in terms of sustainability… I would say that most clients, eh, the lion's share of that discussion is about renewables." ***(Participant A)***

"He was adamant he was going to have his entire roof covered with them [photovoltaics]. I said, 'Insulate your building, double your insulation. Halve your heat load, heat it with an air source heat pump…' which is what we're going to. […] we talk clients out of doing micro-renewables because, over the years, I've become convinced that that is stupid. It's easy fix." ***(Participant A)***

"You can already see it. I mean, it's happened recently where the technology side of things, when the, when you were required to start using heat pumps and things like that. I mean economically it didn't make any sense because for the user end up costing them more to install and then costing them more to run than a simple, you know, boiler system would have. So the worry is if that continues and they keep pushing me down the technology front, then the only person make money is, the guy that builds the systems and maintains them. And ultimately, if something costs more then is it really sustainable?" **(Participant N)**

"District Heating Schemes are relatively uncommon in Scotland, big district heating schemes and because of the building regulations as you are getting tighter and tighter and tighter than the break-even point for district heating is constantly going up to a bigger scheme. So, you know, where 20 years ago it might've made sense to have 30 or 40 houses on district heating, now it would need to be a hundred to make it work. Because the heat loads are so low." ***(Participant A)***

"Passivhaus give you no credit whatsoever for a wind turbine, air source heat pump or whatever. They give you no credit because they see that as the architectural short-cut to minimizing energy and energy conservation. Because all you do then, is you can design a crap building and then you put a turbine, ground source heat pump and tick two different boxes and you're home and dry. It should be fabric first." ***(Participant A)***

"Some clients know about heat pumps and things or, like biomass boilers but, yeah, some don't know anything about anything, and solar panels is the only one they know about because you actually see them." ***(Participant L)***

"So, whereas if, yeah, if I put something like a ground source down then it's quite a new technology. Someone, average Joe, doesn't know how to maintain it, or doesn't even know how it even works. So they're more familiar with something old-fashioned and will go with that or stick with that. Especially if it's cheaper and takes up less space and all of these different things." ***(Participant G)***

"Say that you need 30M² of solar panels and then... it causes its own issues - then you have to find where to put it! [laughs] So, the problems also, like, those sort of things, I now have to solve those problems and I suppose then it gets you thinking of other ways you can achieve something without it."
(Participant G)

"As well as the embodied energy, in a lot of the so called 'energy efficient systems' If you look at photovoltaic panels and how they're made and the chemicals there and the power it takes to make them - that is, that's a significant factor too."
(Participant R)

We can see in this strand that the use of renewables is clearly something that *clients* will often associate with the achieving of sustainable 'credentials', although this is not always the case, as Participant G points out, where the need to understand and operate the chosen system may over-ride this inclination towards the use of renewables.
For our participants, again, the consensus seems to be somewhat split. As far as micro-generation features, such as wind turbines and photovoltaics are concerned, there is certainly no appetite amongst any of the participants to include these in their design. As far as technological approaches to space and water heating, there is also a bit of a dearth of positivity towards such approaches due to reasons of complexity and difficulties in making it stack up financially being cited. Again, Participant A – who we already know is particularly keen on heat *recovery* – is at pains to stress the importance of 'fabric first' in his own design philosophy.

Similar themes are picked up in McManus *et al.* (2010) and in the research of Gibbs and O'Neill (2015), who look at the Code for Sustainable Homes. Gibbs and O'Neill received very similar responses form their participants about the application of renewable technologies in dwellings and the tendency 'to favour very visible green technologies.'

Theme 3: Technology – Strand 4: Usability

"a lot of people still really want fairly simple things"

The penultimate strand in this theme is not hugely prominent in the interview data and reflects views mainly expressed by those of our designers who have worked with Local Authority and Housing Association clients. As such, this strand maybe reflects a particular type of occupancy, but that is not to say that the views expressed here are not a foretaste of what may happen across the domestic sector if particular types of technology and control systems were to become necessary or even mandated.

"council tenants aren't particularly educated about these issues and they don't run them properly." ***(Participant R)***

"…the client (Local Authority] has decided that the tenants are not able or willing or understand more complex features that you put in. Em, so they've taken the decision that we keep it simple. Which, hearing some of the stories from the maintenance guys, is probably...[laughs] at this stage in time is not bad!" ***(Participant V)***

"We've had instances of putting replacement heating systems in, it was air source heat pumps - and then some of them were noisy, tenants complained about it. I don't know if they were taken out, but there was a big stooshie in the papers and all sorts of things. And so again, the client is saying we don't want air source heating... we want something that's easy for the tenants, they can't muck up" ***(Participant V)***

"if the building is too complicated, people don't know how to use it. Again, I was at a lecture about social housing. Particularly people in social housing - they don't operate the building correctly." ***(Participant U)***

"…housing associations have this problem all the time - that their tenants can't operate the systems. And they're complaining about huge electricity bills because the heating is on all the time, because they don't know how to switch off. And that is kind of simple simplified criticism. But nonetheless, how the services work - because services are mechanical and electronic services increasingly - are a fundamental part and they're developing very quickly.", ***(Participant R)***

"And when they're installed it's fine, but then when they are occupied, the user doesn't completely understand and therefore there are lots of call outs about homes being cold or homes being damp or homes being over-warm. But it's perhaps because the houses have now become so sophisticated and people are not educated how to use their home […] a lot of people still really want fairly simple things." ***(Participant D)***

It is interesting that across all the interviews, the citing of problems with the usability of systems are mostly levelled at public sector tenant. There are various reasons why this may be the case but it is likely to be related to the following features: the demographics of a 'typical' tenant, the different building and 'systems' specification decisions that are made in publicly funded housing or, it could just be some other aspect associated with the different ownership/tenancy model that is more prominent in this sector. Significantly, though, and as has been suggested at the beginning of this strand, this could pose significant problems if this is or were to become a prominent feature across the private sector, too, as Building Standard and associated technological specification evolves.

In the literature, Sharpe *et al.* (2018) notes a lack of understanding amongst occupants on the ventilation strategy for their house – for both mechanically and naturally ventilated houses, while (Stevenson, Carmona-Andreu and Hancock, 2013), looking at the usability of control interfaces in low carbon housing, found problems with system design, occupant understanding and issues with MHVR systems in particular. It is interesting to note, therefore, that this has potentially not changed all that much in the proceeding decade.

In the research of (Brown, Swan and Chahal, 2014) there are problems highlighted with tenants' ability to understand, programme and access the 'new' technology in their homes and also issues were also identified with social landlords, who were failing to interact with the tenants effectively about energy efficiency technology. Similarly, Sunikka-Blank *et al.* (2012) identify the need – particularly in the context of the social housing context sector – for a greater level of support for tenants with unfamiliar (building services) technology. Further to this, McManus *et al.* (2010), discussing the technology and energy aspects of meeting the Code for Sustainable Homes standard, pick up on this specifically and note that tenants in social housing tend to be less 'connected' to building services technology and suggest an additional factor of the tenants being less invested personally due to not receiving the 'full' benefit of having made the additional investment in the building that would make the enhanced specification 'worthwhile and justifiable'. Heffernan *et al.* (2015), too, express a high degree of concern for the knowledge and understanding of occupants in homes that aspire to be 'zero carbon'

One final point to note here is that there would be seem to be a clear link to this identified strand of *usability* and the 'performance gap' discourse, incorporating issues related to the 'rebound effect', which are well established in the literature and discussed by booth Shove (2018) and Rosenow and Galvin (2013)

Theme 3: Technology – Strand 5: Scepticism

"we're kind of reluctant to go for technological solutions"

In this final strand we will see several concerns raised around the application of technology that have been grouped under the heading of *scepticism*. There are of course, a number of comments in the other strands of this theme that could easily have been collated here, but they are generally with reference to specific issues rather than technology more generally and so add more to the flavour of the strand that they have been placed under. With the following collection, the views being expressed, therefore are that of being sceptical about technology and technological 'solutions' in dwellings *in general.*

"Buildings have long life spans and too much of our focus is kind of short term - how do we meet this goal, set ourselves targets and we're going to do it with this technology and that technology. I don't think they've really got a structured approach where they look at, well, what was the impact of this on the building, what was the impact of this on the community? You know, how - long-term - how does this affect the much wider scope of things?" ***(Participant B)***

"But I think in general, my observation on houses is that everybody's entitled to a house that is warm and dry. It perhaps doesn't need all the bells and whistles that houses now tend to have." ***(Participant D)***

"the fashion is to go for off-site construction, using complex, composite materials and lots of technology - which I can see being a long-term problem. Because technology changes all the time. If you look at all the technology we had in the seventies and eighties - cassette player and DVD players - it's all obsolete now. You know, I've got I've got boxes of cables for connecting peripherals and it's all obsolete now. All that technology is gone. So what you're doing is, you're putting all this technology into these buildings and then 20 years later the technology has moved on. It's out of date, nobody knows how to deal with it." ***(Participant B)***

"…so I suppose I'm resistant to the idea of sustainability being something that you just plug on bits of kit to make it work" ***(Participant I)***

"I think a lot of the time technologies comes into it a bit too much for my liking. […] Em, initially when sustainability came on board, into the news and was a big thing, a lot of people took a technological approach to it, which meant throwing lots of bits of kit and requires energy to make that and energy to run. So I would say keeping... certainly it needs an element of simplicity to it." ***(Participant N)***

I think a lot of the energy requirements can be achieved, as I say, through far more simple design methods rather than technology. And it's got to be more sustainable because it's a long-term solution, doesn't require maintenance and ongoing energy inputs." ***(Participant N)***

I think... the current trend, there's a preference or fashion. A preference for technology and technological solutions. So again, this kind of goes back to the earlier question about our particular approach. We are not keen, we're kind of reluctant to go for technological solutions." ***(Participant B)***

"I'm not really a fan of lots of technology. All these sorts of things, again, could potentially be building up problems in the future." ***(Participant B)***

This is another collection that is undeniably dominated by a small number of participants but, again, this does not serve to make their viewpoints any less valid. It more likely shows that it is something that is particularly relevant or important to these participants' own distinct work or experience context. We can see concerns expressed here – not just about the design-philosophy of 'solving' problems with technology but also with the longevity of particular technological approaches. This is suggested in terms of maintenance issues, as one might expect, but there are also concerns with 'building up problems in the future' and the observed propensity for technology to be superseded and obsolete quite quickly, although only time will tell how valid these concerns will turn out to be.

In Giesekam *et al.* (2015) it is noted that there is a 'dearth of corresponding research assessing the barriers to uptake [of technology] amongst construction professionals.', even although it is an issue that was picked up by Elizabeth Shove as far back as 1998 (Shove, 1998) who highlighted issues with technical take-up – even in the face of evidentiary benefits – where it is was noticed that it is often 'non-technical' barriers that are the problem in realising 'proven technical potential'.

Several reasons for this have identified in different places. For Häkkinen and Belloni (2011) it is that new technologies are resisted '…*because they require process changes entailing risks and unforeseen costs."* and for Gibbs and O'Neill (2015) drawing on the work of Greenwood (2012), find a parallel issue in the Code For Sustainable Homes requirements state:

> *The Code for Sustainable Homes came in for particular criticism by our respondents as it was seen as encouraging these kinds of high-tech add-on technologies that they believed to be ineffective. In this they were in agreement with other research which shows that many practitioners believe "current policy inhibits, rather than facilitates, their efforts to take what they consider to be the most sustainable design decisions" (Greenwood, 2012).*

Clearly, the scepticism that is demonstrated here – while dominated by a small number of participants – is borne out of experience and this strand therefore shows us that there is much further that can be done in this area too. This is not to say that there aren't misconceptions held by some participants or even that there is a lack of objectivity potentially, but the opinions are held are borne out of some sort of experience. There is therefore much that could be addressed here – both in terms of further clarity that can be provided by government and policymakers as to what role they intend or expect technology to play and for the educators and trainers, too, to ensure that Professionals better informed as they enter the workplace and then develop their careers.

Theme 4: Perceptions of the Profession

The story told by the contributions to this theme revolves, for the most part, around how architectural designers perceive of *themselves*. This encompasses the perceived ability of the designers to influence clients, influence the design outcomes of a project, influence their fellow professionals and, ultimately, how this relates to their place and position of influence in society. By understanding how a designer sees their own profession and its influence, or perceived lack thereof and with consideration of the spheres in which they operate, we can begin to understand what impact this has on their design output more generally and the potentially unseen constraints that are placed upon them. So, while these perceptions themselves may not always specifically relate to sustainability *per se,* there is a natural consequence here, of an *a priori*

association with how these interact with the perceptions of sustainability that our designers hold.

Theme 4: The Profession – Strand 1: Self Perception

"they don't know who RIAS are, quite frankly, from a hole in the ground"

"But the traditional view of the architect was someone who designed, not only a building but groups of buildings and even wider than that, large sections or whole towns - There the influence is huge." **(Participant N)**

"because we are in... very important ways, we are very influential. I don't think we feel we are. If we do, we don't feel that it's our place, you know what I mean, but we are - any profession is privileged in society. I've always felt this. We can moan at each other about all sorts of things. Building Regulations or how little money we make and all the rest of it. But we're privileged to be members of a profession which helped to shape the world we live in. And we literally help to shape it." ***(Participant R)***

"I think maybe there's, there's been times gone by and all the times we were taught about at uni about all the great architects and how they were able to influence societies and times so strongly. I don't think that's the case these days. I think we're seen as a bit of a luxury and a bit of a nuisance by some people in the industry… 'flipping architect want's that - Why? Why?' **(Participant P)**

" …*our role is to educate clients who we meet - on the importance of sustainability"* ***(Participant E)***

"as an architect, often you've got to be pragmatic, have you not. So everybody should be taking a pragmatic approach. Everybody should be trying their best to save a little bit on waste materials, do their bit to save a little bit of energy, drive down energy costs to make everything slightly more affordable." **(Participant D)**

"we're not eco-warriors. We're not going to die in a ditch because someone refuses to, you know, to go along with our aspirations in terms of materials.
(Participant A)

"I think it's our responsibility to try and inform the client, but at the end of the day it will be the client's choice. But it is our responsibility, I believe, to present... especially in new build - for the sustainability of the planet. It's not just even something that the architect is responsible for, it's everybody's responsibility really."
(Participant Q)

"…over time, small steps, will push an agenda. A pragmatic, effective, improvement - in terms of what you would term as a "sustainable design", as "sustainability in architecture". That's our role I think…" ***(Participant R)***

"I would say a big thing that's helped all of us as architects has been programs like Grand Designs. […] I would say that Grand Designs has probably done more for the architecture profession than the RIBA ever has because, you know, that RIBA and RIAS who are very laudable organisations, and I know how much work goes on behind the scenes. And there is a tremendous amount of lobbying of government and lobbying goes on behind the scenes. But it's things like Grand Designs that open people's eyes, you know, for the lay public. The client who's going to walk in the door, you know, they don't know who RIAS are, quite frankly, from a hole in the ground." ***(Participant A)***

"I think unless people are really trying to promote it [sustainability] from, like, in the way that they work - it's still just gonna trundle along like it is." **(Participant L)**

"I mean if you went back 150 years ago the architect was God. He was the master builder. Even fifty years ago, when the architect came on site people were like "oh, the architect's on site" Whereas now "pfffftt, the architect's on site" [indicating a dismissive tone] "what's he gonna come up with today?" And I think that's entirely the fault of the architects." **(Participant U)**

"I don't think our profession has as great an influence as it could have, but that's probably true of architecture to sort of full-stop. We're not necessarily the most protected kind of professions out there and part of that I think is just how we are within society at the moment." **(Participant J)**

"I think the profession's influence has fallen greatly in recent years. […] Project managers, cost consultants and people like that have more influence now than an architect does. So it may be difficult to, to use your influence more now than it was in the past." **(Participant N)**

"I think the architect has become marginalised […] greater society, as a whole, doesn't place that much value on the architect." **(Participant U)**

"And at the moment there's too many people who choose not to even have an architect and it's that so there's an element where people don't necessarily understand that we are necessary? And that's probably your first eroding of our opinion So if people do believe that we're necessary then, yes, they we have influence. […] if you look at the percentages of buildings that still have architects, as in like, professional architects - it's not a great percentage." **(Participant J)**

In this first strand under the theme of *Perceptions of the Profession* we can see a general but clear expression of the waning of influence by our participants – particularly compared to the perceived historical influence of architects and the role that architects have previously held in society. Our participants are effective in being self-reflective in this and see the potential for the role of the designer and, particularly the architect to

demonstrate their abilities and insight, to exert themselves again as professionals who can 'shape the world we live in', as we are reminded by Participant R. Our participants also display a concern, or sense of responsibility for their role and Profession when it comes to influencing and securing sustainability-related outcomes. They do this while recognising that the Professional Organisations have maybe not done enough to assist with this and they also recognise that they have the ability to be more prominent and influential in the spheres that they could, or should, have access too.

This feature of the designer, or architectural profession is found in several places in the literature. For Murtagh *et al.* (2016), there is an encounter with the similar theme of *self-identity* in their work on motivation and sustainable design and, Imrie and Street (2009) pick up on the theme of eroded influence being a prominent factor for some time – pointing to the fact that that this has been acknowledged by both the AIA (American Institute of Architects)and RIBA (Royal Institute of British Architects) have acknowledged this too. The following quote for Ross (2011) seems to capture a significant element of what this strand has been identified to show:

> *Design responsibility is increasingly distributed across a range of disciplines, and the role of the architect has shifted to that of an interface manager ensuring the resolution of parameters defined by others. While the liability of the architect is expanding, the scope of what we consider to be properly architectural is shrinking. Caught between the economic imperatives of component specification systems and the reflexive governmental procedures of regulation, architects find it increasingly difficult to define and safeguard their own disciplinary contribution. (Ross, 2011)*

Theme 4: The Profession – Strand 2: Influence

"I think it's still associated with being kind of rather eccentric or hippy"

A second strand to this theme is that of the role the designer often plays in interacting with the client and how the designer. On one hand, the designer must interpret what the client wants in terms of 'sustainability' – as they might see it – and on the other, how that may or may not result in a sustainability 'outcome' in the more general sense.

"Sometimes it's a bit of a battle with some of the clients because they aren't always willing to learn but I think they know the benefits, but not always willing to take it on board...but we, we do still push for it [laughs]" **(Participant Q)**

"...we would hope as an architect that we get a fairly robust brief from a client but unfortunately that isn't always the case." **(Participant D)**

"I can't say we have lots of domestic / residential, you know, smaller scale clients coming to us and saying 'I want this to be an uber green house'" ***(Participant R)***

"First and foremost, as an architect, we should listen to the client and respect the brief that the client as requested. That's not to say that we shouldn't challenge that brief" **(Participant D)**

For the one-off clients we have more sway - they'll tend to listen to us. This probably leads on to... then there's issues because they're going 'why should I get a Passivhaus, you know, what does a certification actually do for me?'" ***(Participant S)***

"*I think being ecological or sustainable for something can be a negative issue for clients. You know, if you try and push it too hard, people will back away and say they're not interested. I think it's still associated with being kind of rather eccentric or hippy or kind of having to make lots of changes to their lifestyle and things like that."* **(Participant B)**

"A lot of being architect is making people believe you know what you're talking about when you're not exactly sure yourself sometimes." ***(Participant R)***

"I think as an architect, you always have to tell a client what's available, what's out there, make suggestions. But the client kind of determines whether it's something that's high up agenda or not." **(Participant U)**

"I think it's our responsibility to try and inform the client, but at the end of the day it will be the client's choice. But it is our responsibility, I believe, to present... especially in new build - for the sustainability of the planet. It's not just even something that the architect is responsible for, it's everybody's responsibility really." **(Participant Q)**

"I've had both kinds of jobs where the client has been interested and it's taken us down one route and those that aren't interested, you could, you can push it initially, but then there comes a point when, you know, you just back off." **(Participant N)**

"... a lot of influence I would say. Through the design itself, you know, without too much discussion you can influence, em, purely in design terms in choosing the material, suggesting materials, orientation, things like that." ***(Participant N)***

"We tend to say 'how green do you want to feel?' Because a lot of it or a significant part is people feeling that they're doing the right thing by the planet." **(Participant R)**

"…because obviously there is 101 ways you could meet client's requirements and it's what you push in as, as almost non-negotiables and how you will meet that. Um, or at least put in as aspirations to have to meet at the beginning, even if some are negotiable. But again, very often the easy things to resist on are where there is regulation and is, actually 'I don't care if you want to do that, we can't' […] but it partly comes down to how willing you are to argue to a client and tell them that they're wrong and still keep your job! [laughs]"
(Participant H)

"So, yeah, there's a lot of interaction with clients and some of them are more aware, some don't care! 'As long as it's cheap and it works!' But we try to steer away from that and say 'well, these would be better, so…'
*"***(Participant O)**

"So, em, we would probably push our own kind of feelings of sustainability within our design, the way that we approach design that would naturally happen within the design process."
(Participant J)

"I think you have the ability to recommend. […] …we deliver projects that would, you know, we can decide that this is the way we are going and therefore that is what we do. So we do have that strength, and therefore the ability to say "no" but I wouldn't say we never had the ability to change someone's mind necessarily."
(Participant J)

"I think if you haven't put that forward and just gone "right, let's just not bother with that" or "let's just deal with it in the Technical Standards and no more" then it simply just wouldn't haven't been elevated into the bigger picture and it wouldn't have happened. So undoubtedly the influence is significant." ***(Participant U)***

"In a surprising number of cases, we write the brief. Clients know that they want something. Quite often they're not clear on what they want and they will listen to what we say and they have an assumption that we know what we're talking about.
(Participant R)"

"I don't think it can be driven by us solely I think there needs to be better education out there, em, for, for everyone involved in the construction industry. Em, to really get it driving forward."
(Participant L)

In contrast to the views expressed in the other strand of this Theme, the collection of views in this strand revolve around the extent to which our designers feel that they can directly influence the decisions and approach of their client and the project outcomes that flow from this. This is very much a 'mixed bag' of views and it seems likely that this is caused by an interplay between the experience/seniority of the individual, they types of projects and clients that they typically encounter and, probably, their own personal

willingness to impose themselves and offer their design ideals or preferred aesthetic to their client. While it would be difficult to infer too much of the 'real world' situations that exist for our participants in these factors, there does seem to be a tendency for our more experienced and senior participants to feel that they have a sense of being able to influence the route chosen by their clients. There is a clear willingness to promote their own ideals, educate, and even the challenge the client where necessary – but also a recognition from several participants that this can only be done to a certain extent as, ultimately, it is the client's choice when particular aspects of the specification are outside the purview of the Building Standards and their mandated prescriptions.

In both Eisenberg (2016), who looks at the transformation of building regulatory systems and Janda and Parag (2013) who consider improvements in building energy performance, there is the identification of a key role that the architect typically fulfils. This is where the architect occupies a 'middle out' *agent* or *actor* position of influence and is very similar to the point highlighted by Ross (2011) in the previous strand of designers being an 'interface' manager. In addition to this, Murtagh *et al.* (2016) discusses client demand, or lack thereof and the guiding role towards sustainability that the designer is able to fulfil. It should be noted that this strand is not intended to be considered in the same way as the 'power' relationships experienced by building control surveyors that are described in Murtagh *et al.* (2017), although similarities will undoubtedly exist.

Theme 5: Perceptions of Knowledge and Understanding

In this theme, we will look at three strands that contribute to a picture of 'Knowledge and Understanding' from our interview data. First, there is the strand of training, looking at some of the views offered by our designers about the other Professionals and 'trades' that they interact with. Second, we will see what the participants have said about their *own* education and last, we will look at the ongoing education that designers have access to – captured under the strand of Continuing Professional Development (CPD).

Theme 5: Knowledge and Understanding – Strand 1: Training

"You can only run as fast as the kind of slowest member of team"

In this first strand we have a collection of views which shows how our designers perceive the knowledge and understanding of their colleagues, contractors or sub-contractors and this can point to some very useful insights around the *training* that they may or may not have received as well as the impact that this has the potential to have on build quality and, hence, performance gaps.

"But a guy on site just has no understanding of that and they'll just throw it together with the same tolerance as they've always used. Which is about plus or minus 10mm. When in modern construction who should be done to one or two mm"
(Participant N)

"The trouble is, I don't think a lot of them apart from the, almost boutique builder, I don't think they've understood how technical the regulations have become. So you fail an air test now, your building's finished. […] They're slowly learning through bitter experience and failure. What the repercussions of it is. But even then, I don't think they understand fully. And I have a lot of sympathy for them because we're asking them to do something that is very difficult to do on a building site. […] We're building in problems, effectively. So until whole house ventilation with heat recovery comes in as mandatory… We are going to have, and already we have had half a dozen, minimum, problems with condensation because they haven't done it right and stuff rotted. 'it's only been in a year, how can that be? I've never seen that before.' 'Well, no you didn't but you didn't make 99.9% of the building airtight before…'"
(Participant A)

"We're expecting people, not just architects and engineers, architectural technicians… […] then you're down to your joiner and brickie on site. You know, who's probably not read since he was at school. You're asking them to do something that's really complicated now. And not make a mistake. They can't ignore things now that they would have ignored all their lives. You're expecting a lot of people." ***(Participant A)***

"I guess over the years as well, there's shortage of skilled tradesmen" ***(Participant D)***

"It could be, on the face of it, the Assessors coming around going 'you've got that, you've got that, you've got that. That's there, that's there, we've done an air tightness test - it's this airtight. Here's your, you know, gold standard in sustainability' When in reality it maybe lasted for that test and then a month later its, there's a gap in that seal, a gap in that seal - it's leaking, so there's a big probably a big difference between the on paper - It's been designed to this standard and it's been passed to that standard, but actually in its physical form, maybe it doesn't reach that standard." ***(Participant P)***

"You look at the way housing is built and social housing - it's been well designed and been well detailed, but bits of insulation are missed out and things are not there, but guys just don't understand that it's important! And if it's slightly difficult to do and they just don't bother." ***(Participant U)***

[referring to airtightness in timber kits] "So now they're actually, bizarrely, they're more cavalier because they know they'll get a good [result) You know, you don't want it below three because you then need to introduce ventilation, which you haven't designed in... to knock a hole in the wall [laughs]. So the timber kits are pretty good, you know, without trying too hard." ***(Participant V)***

"Be that because they've been taught it years ago and they've never really updated the knowledge. Em, be it that they've seen it done and gone "that looks alright" and copied it. And therefore, you just get the same bad practice or incorrect thing repeated time and again. Because 'that's the way I've always done it' The number of times you hear that…" ***(Participant U)***

"The industry in decimated for the last ten years, all of the skills have shrunk. So you can't just expect all these tradesmen to suddenly appear out of the blue from nowhere - skilled and ready to go!" ***(Participant B)***

"You can only run as fast as the kind of slowest member of team, so contractors have a lot of learning to do, some of the other consultants we've talked about have a lot to do" ***(Participant S)***

What we see here are several views expressed that point to a significant problem being observed across the industry, where the final 'product' is at risk of being compromised and ultimately, failing because of construction and detailing shortcomings on site. Most of the views in this strand are directed to 'trades' being the culprits, but interestingly, the blame is not necessarily being laid at their feet by our designers. What is expressed is more akin to despair that the industry hasn't been able to train or upskill sufficiently in many cases, and that it can hardly be the fault of the person on site – aside, of course, from cases of wilful neglect and laziness – that they are not able to deliver some aspects of building detailing that they simply don't understand. As Participant A points out, some contractors are learning hard lessons through failure and for the current workforce it may end up being contractor and employers who must absorb the training overhead if things do not improve – particularly as Standards potentially become increasingly more stringent. What will remain unknown at this point, is whether there is element to this which is yet to materialise if detailing failures eventually precipitate

'end of life' scenarios for the current generation of domestic buildings much sooner than expected.

In Guerra-Santin *et al.* (2013), there are performance problems identified in the 'Low and very low energy buildings' considered in their research and with that research being conducted prior to 2013, the enhanced levels will be somewhat closer to the levels that are currently mandated or those that will be in the future if the current trajectory is maintained. They found that it was exceptionally difficult for these buildings to perform to the required standard due to problems in the construction process, consequent remedial works and the 'vigilance and scrutiny' that is necessarily required (from the design team) to achieve these levels. There is likely a knowledge and/or skills issue at the heart of these construction problems and it seems that this still exists by and large, as has been shown in this research. Similarly, Gupta *et al.* (2013) and Gupta *et al.* (2015) also partly equate measured performance gaps with a lack of knowledge and quality assurance on-site while Elton and Turrent (2011) show that moisture ingress into the building fabric, and the resultant structural damage can be the result of misunderstood material relationships and poor construction quality.

In a slightly different, training oriented vein, (Clarke *et al.,* 2017) identify significant challenges for the construction industry to meet the needs of the industry – particularly with respect to vocational training and the 'trades'. This includes concerns about the problems of low academic attainments and also requirements for more advanced 'thermal skills' for those who work on site. Baker and Thomson (2017), too, hint at skills loss in a discussion about the continuing use of traditional, holistically sustainable materials. Lastly, it is worth noting that the Callcutt Review of 2007 (Callcutt, 2007) also picked up on different aspects of training needs for the future – one of which was where the prevailing use of sub-contractors let to a disincentive for employers to provide training.

In all of this, of course, the problem is in identifying whether these issues are endemic to the industry as a whole, since – if they are – there will surely be many difficulties in store for the construction industry and the attainment of high performance, low carbon, 'sustainable' buildings.

Theme 5: Knowledge and Understanding – Strand 2: Education

"I don't think we covered that in university"

In the second strand of *Knowledge and Understanding*, our collection has just a small number of views expressed about the education that our designers received from their time at university. As can be seen, there were just 4 participants who offered any substantial thoughts on what they were taught at university. It is interesting to note, yet not entirely unsurprising, that the participants quoted in this collection are our 'early career' architects identified in Chapter 4: Data Collection. They are the participants that have most recently completed their training or are still in the final stages of Part III training:

"Through education we were kind of given, I think, like an introduction at university - but never really sort of a … never really felt like we delved deep enough to get an understanding of what we could be doing, or we should be doing. Like how to do it." ***(Participant P)***

[Referring to Sustainability topic] "my training was more theory and design based probably and less about the science of it all. Em, I sort of think, you know, the sustainable part is more technical or more a science bit of it. Em, that not something that, I don't think we covered that in university, covered that in the course." ***(Participant G)***

"I think when I was at university it was drummed into you and it was, em... I probably knew a lot more the than I do now - I've probably forgotten quite a lot of it to be honest!" ***(Participant M)***

"I don't really feel like my university experience gave me a good basis of knowledge. Which is probably why I come back to the 'fabric first' thing because I understand that concept. Em, I'd say a lot of the environmental lectures and things at uni kinda went over my head a little bit. Because it, well, like a lot of stuff when you're in an academic sense, unless I think, thing's go in a lot better whenever you see the actual practical side of it so..." ***(Participant L)***

While Participant M is open to the prospect that they may have already forgotten much of what was thought to them at university, the general consensus seems to be that what was taught to them in university was either – in their own view – inadequate, or at least wasn't sufficiently robust or prominent enough in their education to have been consciously carried through to their professional working life. Of course, there is no way of realistically interrogating this avenue much further in this research project, and

it may very well be that our participants have been furnished with a set of sustainability-related knowledge and understanding that they are not knowingly aware of but there is no way of knowing from the data available here. I think it is very telling, however, in the way these participants speak of their sustainability education at university, as it does seem to indicate that there may be issues there worth looking at further.

In the literature, Thomson and El-haram point to the need for a step change in the industry and the role that improving the sustainability literacy of professionals is key to that. This is not exactly the *s*ame context as this research, since they look at Sustainability Assessment Methods (SAMs) as being a route to this, but the similarity is there and the need does clearly exist, nonetheless. Both Imrie (2007) and Moncaster *et al.* (2010) cite issues in academia. For Imrie, the problems lie in the fragmented approach taken by different universities towards sustainable architecture education and integrating sustainability knowledge into curricula, while for Moncaster *et al.* (ibid) the development of sustainability knowledge is being hampered due to a poor exchange of knowledge from academia to industry. Finally, for Grover *et al.* (2019), looking at sustainability development and architectural practice, they identify opportunities for enhancing architectural practice via education and suggest that 'Architecture students must be exposed to a wide range of outlooks in order to recognise appropriateness to context and integrate both technical and participatory solutions.' Meanwhile, the issue of 'institutional transformation' is considered by Anne Philips (Philips, 2009) who describes how the *process* of education might be used to strengthen sustainability *literacy*.

Theme 5: Knowledge and Understanding – Strand 3: CPD

"most CPD that the industry provides is essentially marketing under a different guise"

In the final strand of this theme, we will see some of the views that have been expressed about the most prominent means in the *continuing* education of a design professional, Continuing Professional Development (CPD):

"Well, our RIAS Chapter has regular CPD events, obviously, and that's a recurring theme. So we regularly listen to seminars and talks. We have people come here to our office as well. Not necessarily in sustainability but on anything to do with the profession. Mainly building materials and techniques, I would say, though."
(Participant A)

"Our CPD program is, you know, because of the way we organise it, has sometimes I think a little bit of a case of the blind leading the blind and I'm sure that there's an awful lot of other information out there and people that we could get into our CPD program that we just make enough aware of."
(Participant I)

*"As a sole practitioner, CPD is… on one hand it's tricky, on the other it's dead easy. There's an argument that every single day you're doing stuff is CPD. […]I think in terms of the kind of, sort of, archetypical somebody coming and giving a slideshow at lunch time thing - that doesn't happen - but frequently you would have to say "how much do you actually get out of that?"***(Participant U)**

"Our CPD's haven't really been... we tend to do a lot of manufacturer CPD's which - they'll touch on concepts because well, everyone, every one of them wants to tell you they're sustainable(!) so they'll try and set out their case to show why. But, em, yeah, the depth of that - well - it's superficial in a lot of cases but... Yeah, I haven't been to any real sustainability led CPD's to be honest.
(Participant L)

"we have CBD programmes in the office and we have, we have a sustainability group and we have a technical group who do educate us on developments in the Technical Standards - the changes that are relevant to our day job"
(Participant E)

Well, we get CPD here - continued professional development - on a monthly basis and most of, or nearly all the suppliers are... not I suppose plugging, but in some respects they are - they've got to tick the box for sustainability. Some are more interested, obviously, than others…. And it comes across! ***(Participant Q)***

But it tends to be just a selling job, you know? ***(Participant V)***

"CPD is a requirement to continue as an architect, and you have to try and make sure that it's relevant and it's all very relevant in the office. You get manufacturers in to show us their latest products basically - just dressed up as CPD. But a lot of the time, it's just a case of putting some hours in your book."
(Participant N)

"Em, the choice I find sometimes somewhat bewildering [referring to potential topics for CPD] and whether there's a way of learning more about the concepts without - you can understand, I guess, that all the research has been put in by a particular company that has a particular skew or interest and therefore it's quite hard to just learn the generalized concept so that you could then direct it where you wanted to do it"
(Participant J)

"Yeah, well, the trouble is most CPD that the industry provides is essentially marketing under a different guise, so in general everyone, whatever their product is, is what's going to save the world [laughs"] ***(Participant H)***

"CPD - just generally - we've got, we're trying to do a few sessions a month. Jane [office manager] basically just organises whichever ones are available and she'll put them out to see what gets the vote." ***(Participant K)***

Several features of CPD can be noted here in terms of how it is *generally* conceived of, and delivered, in the experience of the participants in this research. It appears to be something that most of the participants value to some degree, alongside some voices of doubt as to its effectiveness. It is also noted to be something that has to be undertaken in order to remain chartered, although there does seem to be sense in which this is merely going through the motions and logging 'hours in your book' regardless of how useful or effective the CPD is found to be.

What is abundantly clear from our participants here, though, is that CPD delivery seems to be a marketing opportunity for companies representing particular brands or products to get their products known in the marketplace. This appears to be at the expense of a genuine educational opportunity, on occasion, and there doesn't seem to be any quality assurance provision for any 'educational' component that may be delivered in the CPD.

As we have already seen in Chapter 2: *Context* a RIBA registered architect is required, under the RIBA Code of Professional Conduct (RIBA, 2019), to undertake CPD in order to continue in practice, and RIBA do provide *some* guidance on how this should be structured and approached, although the guidance does self-confess to be a 'very liberal and flexible' exercise[66]

In the literature at large, design, or architectural CPD does not appear to be a topic that has received much attention thus far but as an aside it is interesting to note that Giesekam *et al.* (2015) point out that 'Construction is a highly fragmented, risk-averse, supplier-driven industry' and this 'supplier-driven' aspect certainly seems to have

[66] RIBA website: https://www.architecture.com/education-cpd-and-careers/cpd/fulfilling-your-cpd-obligations (accessed 22 July 2019)

made its way in to the CPD structures of the industry, too. Meanwhile, Shea *et al.* (2018) do point to CPD as being a valuable to enhance learning and upskilling of an architect in poorly understood topics – in their case, the concept of 'Universal Design'.

6.8 Indicator Themes – Discussed

As was mentioned in the introduction to this chapter, the process of this *Thematic Analysis* revealed glimpses of several other underlying themes or features that were present in the data. The scarcity of these 'glimpses' led to the decision to not explore these to any significant depth at this point, though they are presented here as indicators – hints of features that spark some intrigue and views that may be present more widely in the designer population but that were not quite prominent enough in the data to warrant the development of a theme.

Indicator Theme 1: Taxation Innovation

The following two quotes were offered in the context of a discussion around upgrading existing housing stock and the 'retrofit' agenda, where the participants muse different ways in which the upgrading of standing stock, which was briefly looked at in Chapter 2: *Context* might be incentivised. Although not a focus of this research, these thoughts do offer some insight into the inner perceptions of our designers in relation to the wider spheres of sustainability in the built environment, and does overlap with several aspects discussed by Gupta *et al.* (2015). Meanwhile, incentivising for 'low energy retrofit' – a not too distant theme – via VAT reduction has also been identified by Osmani and Davies (2013).

> *It's so simple isn't it - rather than paying your VAT, to upgrade your existing house and then the whole country's carbon footprint comes down"* **(Participant L)**

> *"I have a point of view – what you should do is say that everyone pays VAT on everything, that there's no VAT thresholds. Everyone pays VAT. And therefore, if somebody say "there's no VAT" you know that it's not legitimate. And you also don't get... em, my business isn't VAT registered because it's below the VAT threshold, but you've got this big great cliff face at the VAT threshold that's an impediment to growing your business. And if I then go VAT registered, I'm then competing with people who are not VAT registered, so I'm 20% more. So, I just think... level the*

> *playing field. Everybody pays VAT. And if everybody's paying VAT - I don't know the numbers - but if you worked out the number of the people who are not paying VAT, by virtue of the fact that they're now going to be paying VAT, and all the VAT on the new housing. Then what you could do is reduce the VAT threshold on everything to a lower level. And that would be that."* ***(Participant U)***

Indicator Theme 2: Housing Shortage:

The following views offered by participants relate, again, to an aspect of the context this research that was touched upon in Chapter 2 – the housing shortage issues that the UK is currently suffering from. Towards the beginning of this research, this was expected to be a central theme in the Data Analysis stage but, it ended up being a much less prevalent. It seems that, although the designers are certainly aware of the housing shortage, and they do have views – as we shall see below – it is clearly not something that is a driving force in their work or something that is a prominent feature of their thinking as they approach their day-to-day work. I this small collection, there are two clear strands of thinking. First, Participant B highlights the need to address the social issues that will emerge if the efforts to meet the housing shortage are going to be 'sustainable' while Participants D and R potentially offer conflicting solutions to overcoming the housing shortage.

> *"And you end up with this ridiculous, over-simplistic target - building 200 thousand houses a year and there's going to be all these peripheral issues which aren't going to be addressed. As long as you keep hitting the numbers, you know, you're going to keep building in all the social problems."* ***(Participant B)***

> *"I think in residential, houses are probably designed to a standard that they perhaps don't have to be given the current housing shortage"* ***(Participant D)***

> *"There's not enough houses for people. Decent houses. How do you resolve that? I think there is a solution* [referring to high quality, low carbon, offsite construction] *There is inevitably a tension, because you could argue that the, the solution is to build, just throw up more houses and make them out of whatever is cheapest"* ***(Participant R)***

Indicator Theme 3: Lingering Thoughts on Definitions

This first part of this Indicator Themes is not so much represented by a collection of quotes, but by a persistent feature, or feeling, that seemed to crop up in almost every interview and is captured very well by the following quote from an interview:

> *"A lot of being architect is making people believe you know what you're talking about when you're not exactly sure yourself sometimes."* ***(Participant R)***

It is not the intention here, in any way, to suggest that any of our designers are being dishonest or duplicitous but it is to point out that some participants were very adept at thinking on their feet and offer views on topics that they obviously knew very little about, and particularly around different aspects around the 'definition' of sustainability. This stems from an aspect of the coding that took place as part of the Thematic Analysis, where the code '*Doesn't have a clue!*' was used and it was applied in 15 out of 21 interviews.

This coding was most commonly used in relation to the conversations that developed around the question about the participants' understanding of the social, environmental and economic aspects of sustainability and in the definitional aspect of the term 'sustainable development'. As has been stated in Chapter 2, it is not an aim of this research to investigate what the definition of sustainability is or should be for either architects or the construction industry at large, however, this code does provide some interesting features of the interviews that are worth commenting on.

Firstly, the concept of 'sustainability' incorporating the aspects of social, environmental and economic spheres was being considered by some participants for the very first time. Now, while it is important to stress that this particular view of what sustainability encompasses is not being offered as *the* definition, it is nonetheless absolutely confounding that anybody educated in the last number of decades (most of the participants), ostensibly educated to a high level and who currently works in the construction industry has not encountered this 'view' of sustainability before. Indeed, one participant assumed that it was something that I (the interviewer) had defined myself! Without labouring this point, and without muddying the points raised in Theme

5, it is enough to say that there are clear failings – to some degree – in both the CPD and educational material that some of our designers have been exposed to.

Secondly, here, are some reflections on how some of the designers in this research handled the term 'sustainable development', which was the subject of the final interview question for most of the participants. In Chapter 2: *Context*, there was some consideration of the significant definitional issues with the terms 'sustainability' and 'sustainable development' that persist and, indeed, have been worsening as their use has become more widespread and there is an aspect of this that is relevant here, too. From the interview data is has become very apparent that the use of the world 'development' appears to be very difficult for a designer to conceive of, and in a completely different way to how it was laid out in Chapter 2. This is because in the everyday, working language of a designer, the word 'development' takes on a completely different meaning and will almost invariably be preceded by the word 'housing', or a word conveying something similar. When a designer sees or hears the word 'development' they will not immediately think of the progress of society or anything on that scale, they will think of a housing 'development' or 'the development of land' i.e. a considerably narrower, localised concept. As before, there is no need to labour this point either, but it is important, I feel, to highlight a) this additional mis-match of definitions and b) the fact that framing the Building Standards, for example in the language of 'furthering the achievement of sustainable development' is a concept that will be completely lost on most designers, as the following quotes – all in response to a question about what 'sustainable development' means demonstrates:

"And the question of whether it is sustainable development, whether it's a good idea to build there, whether it's a sustainable thing to do, to build that building in that location or not" ***(Participant A)***

"Gobbledygook!" ***(Participant F)***

"I don't know! eh… further the achievement [laughs], em...it does make me, it makes me recall, you know, was it the Paris climate summit…" ***(Participant G)***

"I've never heard that before but I would think that eh… I think it's…" ***(Participant E)***

"Em, slightly opaque language really. I'm not sure what the intention would be there. I suppose my initial impression would be that there is a kind of greater focus on perhaps a kind of economic agenda there." ***(Participant I)***

"What do you mean by 'sustainable development'? […] Em, sustainable development is, is much wider than achieving a Bronze Certificate...but I don't know how far you need to push it developers and others to achieve it" ***(Participant K)***

"I think it's looking for an improvement and a continuing improvement over the current standards at the time"
(Participant N)

"I've got no idea what that means. It sounds like politician wrote it."
(Participant R)

"I don't know how you further achievement. Even grammatically, it doesn't make sense. You can build on the achievements and have other achievements. Once you've achieved something you can't further it. It's done. It's like saying something is 'quite unique'" ***(Participant R)***

"Well, I'm presuming they're meaning that it will contribute to it or it will take it further along the road. So the U Values and energy requirements for the houses is getting pushed all the time. So I presume that's what they meant, but could be wrong!"
(Participant V)

"I think they want some sort of recognition for sustainable design which is what section 7 is trying to do... I suppose, maybe recognising that sustainable design is a minority approach at the moment, I don't know." ***(Participant L)***

Em... making as many people as possible building to a higher standard and creating more sustainable things…"
(Participant M)

"Em… yeah… it's the, I'm sure it's the closeness to sort of work-life balance. Em, a lot of people commuted a long distance to work. I suppose we're looking at developments where you can sort build sort of small towns and have workplaces within that, so the idea is to bring communities together and sort of… so, we've done a few sort of developments based around that… Other than that, I'm not sure." ***(Participant O)***

"Sustainable development, as I see it, should be looking at greyfield sites, brownfield sites and bringing them back into use, try to use what we've got before you then start to edge out. And then, at a level below that you've got sustainability within, regards to - how do you structure a street, how do you arrange things around streets and then you can get into the building itself." ***(Participant S)***

Indicator Theme 4: Perceptions of Perceptions

Finally, we have two views expressed by two different designers that offer something completely different in the context of this research but do add an extra touch of colour amid all the other interview data discussed here. These quotes are in direct reference to both the participants' interactions with fellow professionals or site workers and the

also the topic of sustainability in their projects. These quotes ably show the humorous side interview research that can occur and probably do not require any further commentary:

"it's something the architect deals with and it can be perceived as a wee bit 'sandals and lentils' by some other professionals, you know… 'we've got an eco-architect on this project'" ***(Participant U)***

"Eh, your average builder, I think, looks upon an architect as a kind of airy fairy, eh, closet homosexual, you know. Who's come down from his cloud to give you a drawing he can barely read, thinking "it's not him who has to try and do this in a gale" and, well, that is true. About the gale anyway!" **(Participant A)**

6.9 Chapter 6 Summary

This chapter opened with a short discussion around the development of themes, based on the coding exercise that was discussed in Chapter 5: Data Analysis. This discussion looked at the idea of sensemaking and how the Thematic Analysis is used to make sense and order the data into the themes that develop.

Following that the five themes that are highlighted in this research were presented and discussed before establishing links back to the literatures. The Five themes are:

Theme 1: Perceptions of Cost
Theme 2: Perceptions of The Building Standards
Theme 3: Perceptions of Technology
Theme 4: Perceptions of the Profession
Theme 5: Perceptions of Knowledge and Understanding

In addition to this, four further 'indicator' themes – emerging themes that it was not felt appropriate to ignore – were presented and briefly discussed. These four 'indicator' themes are:

Indicator Theme 1: Taxation Innovations
Indicator Theme 2: Housing Shortage
Indicator Theme 3: Lingering thoughts on definitions
Indicator Theme 4: Perceptions of perceptions

In Chapter 7: *Conclusions and Recommendations,* which follows this chapter, the conclusions and implications of these themes will be laid out as the final portion of *Phase 6: Produce the Report* of the Thematic Analysis process that is being followed. In addition to this, Chapter 6 will make recommendations, based on the conclusions of this research, as well as recommendations for further research.

CHAPTER SEVEN

CONCLUSIONS AND RECOMMENDATIONS

'I suppose in all sustainability you can only do what you can affect yourself.'

Participant V (2018)

7.1 Introduction and Summary

The final chapter of this thesis serves several purposes as a conclusion to this research. First, it will complete *Phase 6* of the Thematic Analysis Process: *Produce the Report*, which will be laid out below in section 7.2. Having presented the themes that have been developed in Chapter 5: *Discussion,* this chapter will consider each theme in turn, drawing associated conclusions. The chapter will then turn to recommendations, contribution, limitations and suggestions for further work before a final section for some closing reflections.

7.2 Conclusions Overview

Before turning to each of the themes, there is the opportunity here, to draw some general conclusions, in light of this research as a whole.

First, is that for architectural designers, sustainability is manifested in two different forms – as a ***concept*** and the ***deliverable****.* The *concept*, also comprising elements of a 'definition', includes competing abstract notions and understandings of 'society', 'the economy' and 'the environment' as has been considered in different places in this research. Often, in the working life of a designer, these are effectively intangible factors that can seem quite disconnected form their everyday work. The *deliverable* manifestation of 'sustainability' is much more tangible for the designer. Although it demonstrably falls quite short in terms of what would be considered 'holistic' sustainability that would incorporate much more challenging elements of economic, political and societal application – the 'definition' of sustainability as found in the Scottish Building Standards is quite clear. It might be that calling Section 7 in the Building Standards 'sustainability' undermines, or even pollutes *definitional* understandings of sustainability – but that is not relevant for the designer in this context. As a *deliverable,* designers are effectively being told what sustainability is by the Building Standards and, although that does (currently) largely revolve around issues of Energy and CO_2, it doesn't alter the fact that it is by addressing these issues in their design that designers *deliver* 'sustainability.'

While it is, of course, recognised that themes are both imperfect and subjective, the following sections draws each of the themes that have been developed to a close.

Due to the novel approach taken here for presenting the 'report' element of the Thematic Analysis, this necessitates that the concluding remarks for each theme are interwoven with small elements of discussion that are related to each theme *as a whole.* As such, there will be some additional references to the literature – but they are not from any new sources. It is simply that they are considered more pertinent to the whole theme rather than any individual strand.

7.3 Theme 1: Implications and Conclusions

In the development of **Theme 1: *Perceptions of Cost***, the following five strands were identified:

1. Aspirations
2. The Building Standards
3. Sub-optimal Outcomes
4. Publicly Funded Dwellings
5. Capex and Opex

What, then, can be concluded when considering the theme as an amalgamation of these strands? While it may be true, it is not sufficient to simply to say that 'building is expensive and building more sustainably tends to be more expensive'. It is much more than that.

What is particularly interesting for this theme, is that no questions in the interview 'crib sheet' are directed at cost. Other than some unavoidable follow-up questions, it was almost invariably the participant who raised the issue of cost. It is obvious, then, as has already been said, that cost and *perceived* cost is a tangible barrier to both sustainability and, consequently, design aspirations – but it is also clearly a dominating *distraction* to the architectural designer, as is ably demonstrated by how pervasive it was in the interactions in this research.

Although, as Pickvance (2009) asserts – and this is supported by the findings in this research, that – 'The house-building industry in general is against anything that adds to costs…' and, it is observed that the designers do have an appreciation of how enhanced specification for 'sustainability' will undoubtedly reduce running costs, there is one

further feature to highlight here. As the Building Standards become more stringent, they are causing the cost 'baseline' to shift. Instead of being an add-on, as some enhancing features become mandatory, they will just become absorbed into part of 'what it costs to build a house'. This does not address general affordability issues, of course, and it remains to be seen what will happen if specification enhancements plateau, but it may mean that perceptions of cost will shift in the future.

7.4 Theme 2: Implications and Conclusions

In the development of **Theme 2: *Perceptions of the Building Standards***, the following five strands were identified:

1. Positive Improvements
2. Problems
3. Differences – *within* and *between*
4. Energy and CO_2
5. Enhanced Levels

When considering this theme, it is clear that the Building Standards are a multifarious and divisive topic for the architectural designer. While there is notable appreciation for the way in which the Building Standards provide a useful backstop and are evolving in an honest and realistic' way, there are clear problems, too. There is a tendency, it seems, for volume house builders to treat the Standards as a minimum specification that must not be deviated from and, if this is as widespread as it might appear, this will cause problems for housebuilding in Scotland. With pressing housing shortages across the UK, and volume house building being the only realistic means of meeting that need, 'crap', 'shoddy' houses combined with value engineering will not likely lead to positive sustainability outcomes in the end.

As Imrie (2007) pointedly notes about research that is needed in this area – directly relevant to designers – and which seems to remain the case:

> *'This… is suggestive of a research agenda that ought to treat building regulation and control much more seriously as a subject of scholarly enquiry and investigation. There are volumes of research and writings about planning, architecture, and design, yet major gaps and absences in writings about, and understanding of, building regulation and control systems. This is curious because…regulation is core to architects' practices, and in turn such practices (re)define, in part, the scope and possibilities of regulation.*

Like the previous theme, there is a *dominating* factor to this theme too – that of the perceived pervasiveness of CO_2-related outcomes in the Standards. This is an uncomfortable feature for several participants and is a demonstration that some participants do not see this as compatible with a more holistic understanding of sustainability. Indeed, several elements are suggested for inclusion that are part of some Building Assessment Method schemes that they thought *ought* to be included in the Standards, but are not currently.

The attitudes expressed towards enhanced levels of achievement is in sharp contrast to general positivity towards the Standards themselves. It seems that there is a clear problem with how these elements of the scheme has been implemented, and, in a cost-dominated market, the perceived unmarketability and lack of inherent value is undoubtedly a considerable factor here. In light of what else this research has revealed, and unless there are significant changes to how the industry is receiving these enhanced levels, it may be that as the Standards continue to evolve this will become less of an issue, allowing the enhanced levels to gradually sink into the background as they become the norm. Of course, that outcome cannot be taken for granted and there is therefore an important role for policymakers to play to endure that as the Standards do develop – to something that might be *transformational* even – that it is done in a way that will ensures that architectural designers can wholly embrace and promote them.

7.5 Theme 3: Implications and Conclusions

In the development of **Theme 1: *Perceptions of Technology***, the following five strands were identified:

1. Fabric First?
2. Airtightness
3. Renewables
4. Usability
5. Scepticism

The prominent feature of this theme is broadly the clashing of two different 'schools of thought', but not as clearly definable as 'pro' and anti' technology. The Sullivan Report (2007) that was highlighted in Chapter 2: *Context* specifically pushes for the 'Nordic' model and when this is applied stringently, this ultimately becomes equivalent to the 'Passivhaus' standard. With very high levels of airtightness, houses built to this standard invariably need to have Mechanical Heat Recovery Ventilation (MHRV). Similarly, the 'fabric first' approach which, as has been highlighted in Chapter 6: *Discussion*, prioritises insulation and airtightness, will also invariably need MHRV if the prescribed airtightness levels demand it.

The 'problem', then, is a clash of philosophies. Some of the designers in this research are ardent supporters of 'fabric first' but have a strong dislike for 'technology', and MHRV in particular – and for a variety of reasons. While the Building Standards still allow for airtightness levels that do *not* necessitate MHRV, this will not cause problems, but if the trajectory is 'Nordic' then there is surely an unavoidable clash of design philosophies in the waiting.

In Chapter 2, it was also proposed that, for some, technology can be the 'hero' – a notion that is a combination of a person's own social / political outlook and the location along the weak-strong sustainability 'spectrum' that they occupy. Put another way, it is a factor of how much they see the world with an outlook more like a *Wizard* or a *Prophet*. While this does not explicitly dominate as an over-riding factor in this theme, it is

undoubtedly present as an undercurrent to what has been expressed by the participants.

As Pretlove and Kade (2016) point out, 'Low carbon homes have given us *complex* buildings with *complex systems'* and there are clear concerns expressed by the designers about this complexity. It may be that designers don't want 'to suffer the consequences of any failures' as Williams and Dair (2007) suggest or it might be that they have a deep distrust for 'technological solutions which require no changes in behaviour or lifestyles by household occupants' as Reid and Houston (2013) consider, but is clear in all of this, that if occupants don't know how to use, or even live with, the technology in their home – whatever that technology may be – it will almost certainly be to the detriment of sustainability outcomes.

7.6 Theme 4: Implications and Conclusions

In the development of **Theme 4: *Perceptions of the Profession***, the following two strands were identified:

1. Self -Perceptions
2. Influence

There are some clear conclusions that can be made here, further to the consideration of the constituent strands of this Theme that has already taken place in Chapter 6. The first is that when given the opportunity, the designer can be in a position of significant influence – particularly at an individual dwelling level. This position is not always afforded to the designer, however, and, it would seem that invaluable insights form the designer's knowledge and experience are sometimes being missed.

The second conclusion that can be drawn here, is the undeniable loss of influence and status that the architect has suffered in recent times. This is keenly felt, not just in the situations described above, but more broadly in the spheres of influence in society where architects and designers of the past took the place, and that they are less often being invited to take in society today.

This situation is being further exacerbated, it would appear, by the claim made by several participants that on the many volume housing building projects that are being conceived to 'solve' the housing shortage 'crisis' in the UK, the role of the architect is often being diminished to almost nothing.

7.7 Theme 5: Implications and Conclusions

In the development of **Theme 5: *Knowledge and Understanding***, the following three strands were identified:

1. Training
2. Education
3. CPD

When considering how the different strands of this Theme come together it is apparent that there are potentially some serious inadequacies in the industry, and the following three conclusions can be drawn – tied directly to each strand:

First, is that the current generation of skilled and semi-skilled 'trades' i.e. those who physically build houses, are not being equipped with the necessary knowledge and skills to deliver the current or future performance requirements of housing. As the requirements of the Building Standards have been enhanced, the training and up-skilling of the trades has not been addressed across the industry. As minimum requirements become more stringent and, therefore, *detailing* becomes more critical to achieve this performance, this factor will be felt ever more acutely. Very often, too, when skills shortages are discussed for the construction industry it is expressed in terms of a shortage in the *number* of people with the skills – which is true – but it is clear that there is an additional, equally critical, component to this if the *level* of knowledge and skills that they hold in not adequate either.

Second, is that the education and training of architectural designers is diverse and varies greatly across educational institutions, along with design and aesthetic philosophies. The current approach for defining what is incorporated in the education

of architects is not leading to holistic understandings and this, it seems, is further exacerbated by two features that John Brennan – lecturer in Edinburgh university, who was referred to in Chapter 6: *Discussion* – described. The first is the apparent 'turf war' between the ARB and the RIBA as they both try to influence and determine what must be delivered to students to meet what they each have determined to be most important. The second is the influence that an increasing number of international students that study in UK institutions is having. For architectural education, this has resulted in a *dilution* of both the UK and Scotland-specific elements such as the Building Standards that were previously taught in more detail and, instead, it is being left for the work place and CPD programmes to fill this gap in knowledge after students graduate.

The third, and final, conclusion here is that the current mode of CPD delivery for architectural designers is not sufficiently robust, or quality assured, to ensure that the recipients are being *informed* and *educated* with appropriate emphasis, and to an adequate standard. The RIBA do provide a (seemingly) thorough CPD programme but it is not substantially regulated or actively monitored. The RIAS do not provide a central CPD function, and it seems that this is being left to individual 'chapters' to organise and deliver themselves. Further to this, the ARB also does not provide any centralised CPD function and, indeed, is not even mentioned in their own Professional Code. At the individual practice level, although there are notable exceptions, the CPD delivery is *dominated* by manufacturer and product-specific marketing, and this is often accompanied by self-proclaimed sustainability credentials in an attempt to meet the 'tick the box' of the CPD including elements of sustainability information.

7.8 Recommendations

Based on what has been revealed and discussed in this research, along with the conclusions that have been drawn, above, the following recommendations are made – particularly with reference to Aim 2 for this research, laid out in Chapter 2: *Context*:

> *To identify, and develop, pragmatic and directly applicable recommendations for the further development of a) sustainability policy and b) the education and professional development of architectural designers in Scotland.*

For Policy Makers, Legislators and the Scottish Government:

1. To work with architectural designers to provide clarity on the 'trajectory' of the minimum sustainability-related requirements of the Building Standards in Scotland to enable designers to begin developing effective design solutions that will meet the needs of the Standards and different design philosophies.

2. Further to Recommendation 1, to work with architectural designers to determine what effective future measures can be put in place as the Standards become more stringent to counter the effects of the diminishing returns – particularly in relation to further increasing the Energy and CO_2-related performance requirements.

3. To work with architectural designers to consider what elements can be added and developed in the Building Standards to address more 'holistic' sustainability needs and concerns.

4. To work with architectural designers to determine the future of the 'enhanced' levels of achievement available under Section 7 of the Building Standards. This should include consideration of whether it will be more effective to hasten the raising of the minimum requirements rather than develop the enhanced levels any further.

5. To consider ways in which the role, influence and status of the architectural designer can be enhanced in the construction industry in Scotland – with particular emphasis on the volume housebuilding sector.

For Skills Providers:

1. To further asses how the 'skills gap' in the construction industry can be alleviated – not just in terms *number of people* but by enhancing the *capabilities* of those who are in training and being recruited for training and skills development

2. To work with Legislators and Policy Makers to better understand the future *capability* needs of the 'trades' who work in the industry. This should be done in conjunction with a consideration of the 'trajectory' of the Building Standards' further evolution – considering the need for education and skills for technology, building services, building physics and thermal performance.

For Educators:

1. For the different educational Institutions who educate architectural designers to come together and consider the ways that they might better *harmonise* what they deliver, in terms of holistic sustainability education – even if this is aside from the obligations that they have to Professional Bodies such as the ARB and the RIBA.

2. To seek out ways that the sustainability Legislation and Regulation requirements in place in Scotland, and the UK, may more effectively be incorporated in the educational material and experiences that they provide.

3. To consider ways that a more robust understanding of the role CPD might be incorporated into the educational material and experiences that they provide. This should include a consideration of how expectations can be shaped to enable students to identify what constitutes effective and healthy CPD delivery, that will be of tangible benefit to them professionally.

For the Professional Bodies – the ARB, the RIBA and the RIAS:

1. To work more closely together to provide clarity around the role and requirements of CPD and assuring the quality of what it delivered. This should include a consideration around how the *dominance* of marketing may be lessened and how better defined CPD delivery outcomes might help shape holistic sustainability perceptions more consistently across the industry.

2. To work with Legislators and Policy Makers to determine the ways in which CPD delivery will need to change to meet the needs of further enhanced sustainability and building performance requirements in the Scottish Building Standards.

3. To the ARB specifically – to consider ways in which CPD, as a professional function, might be included in their 'Standards of Professional Conduct and Practice' and more pragmatically, made more prominent as an activity that is beneficial in the working lives of their members.

7.9 Contribution

In the detail of what is outlined above, there is the framing of the *contribution* that this research can make to the construction industry and other, broader, fields too. That is, the insights and knowledge that have been gained in this research, and how they will be of value to industry, academia and policy makers.

While this research can provide a springboard into other avenues of research, as will be considered below, this research can make the following specific contribution:

- For Construction Industry Professionals and Architectural Designers, this research provides critical insight into the 'lived world' of these Professionals and will contribute by helping to provide a greater understanding of how fellow professionals approach and understand the context of their work.

- To Legislators and Policy Makers in Scotland – and further afield too – the continuing development of Building Regulation and Standards will benefit from the insight that this research has provided relating to how architectural designers view these guiding regulations, use these regulations and in the light of that how these regulations might be developed in a mutually beneficial and applicable way.

- This research will be of particular interest to Educators, those delivering skills-based learning and, crucially, those who develop associated syllabi, guidance and future planning for these activities. This research will provide a significant contribution to the further development and integration of an effective understanding of the various facets of sustainability and sustainable development – as it relates to the Construction Industry – into the educational frameworks that drive the foundational training and ongoing development of designers.

7.10 Limitations

At this point, it is appropriate to mention some of the limitations imposed on this research. Although not necessarily and substantially detrimental to the research outcomes, the defined scope of the research could be seen as a limitation. The boundaries that were set for the research – specifically in terms of location, subject matter and participant-type – were both considered and deliberate. However, it is noted that the research may have benefited from the inclusion of a more diverse cohort of participants to include other professionals and clients, in particular.

That being said, it may then have been difficult to reach 'data saturation' with each sub-group represented in the cohort without increasing the number of interviews considerably beyond the ideal range of 15 +/- 10 that was mentioned in Chapter 4: *Data Collection* and this would likely have rendered the project impossible to complete timeously and to the requisite standard.

Aside from this, a further limitation could be claimed in what Murtagh *et al.* (2016) say in that, 'A qualitative approach cannot suggest how widespread the findings may be for a wider population.' While this may be true, it would also, and conversely, not be possible to achieve the insight and rich understanding of designers' 'lived worlds' with a quantitative method.

7.11 Suggestions for Further Research

As was referred to in Chapter1: *Introduction,* it is noted, as Giesekam (2015) does, that there is a 'dearth of qualitative studies' in this research field. This fact, in combination with what has been explored and revealed in this thesis, indicates a potential wealth of 'future promise' for other, similar research studies. The following research avenues are therefore suggested:

- An expansion of the **scope** of this research to include different sets of participants, including other groups of construction industry professionals

- An expansion of the **scope** of this study and an appropriate change of **emphasis**, to include clients in a similar study

- A further study to '**map'** the themes identified here to different participant groups, such as other construction industry professionals, clients or designers working in other nations in the UK or, even, internationally.

- A further study to **explore** the *indicator themes* in more depth, working with a different cohort of architectural designers, in addition to other construction industry professionals and clients.

7.12 Closing Reflections

In drawing this final chapter to a conclusion, the following remarks are offered as a personal reflection on the outcomes of this research, that have not necessarily been expressed elsewhere in this research.

First, is to consider what I *expected* to discover at the outset of this study and, certainly, having engaged with some of the material in Chpater2: *Context*, but prior to undertaking the research interviews.

- I expected to discover an understanding of 'holistic' sustainability that was neither coherent nor robust and this was mostly confirmed, as has been considered in different places in this thesis.

- I expected there to be a considerable amount of cynicism towards sustainability issues and complains of 'tick box' exercises, but this was certainly not a prominent feature. Yes, it was present, but not nearly to the extent that I expected.

- I expected there to be a sense of a marginalised role for designers and this was largely confirmed.

- I expected to encounter a sense of frustration stemming from the focus that the Building Standards have on Energy and CO_2 reduction. This, again, was largely confirmed, although the real value was in discovering the detail and underlying reasons for these frustrations.

- I expected there to be more discussion and more concerns expressed about the End of Life (EoL) scenarios for the buildings that the participants' designed. In the end, there was little discussion around this, despite several attempts to explore this with different participants. It seems that EoL is either not 'on the radar' for many designers or it falls under the category of 'manjana', as it has so little impact on the day-to-day work of the designer.

- I also expected there to be considerably more reference to both the RIAB 'Plan of Work' and the 'Sullivan Report'. This was maybe naïveté on my part, but I was shocked to discover how little reference was made to the updated 'Plan of Work' that was introduced in 2013 and includes specific sustainability checkpoints. Despite veiled promptings in the interviews, only *two* participants referred to the RIBA stages specifically and one of them referred to the old stages that were retired in 2013.

In all this, too, it is interesting to reflect, again, on the interview interactions themselves, and two features stand out. One is that the interviews were – for many participants – a cathartic process, that was providing them with a 'sounding board' that allowed them to vent their frustrations of various descriptions. Another feature is that in some interviews it felt as though the participants were anticipating that I would be able to change things in some way. This was not a prominent aspect, but it did feel like that sometimes and is probably a function of the cathartic process that they were undergoing.

The final reflection here is two-fold. First is what was so concisely expressed by Participant V in one of the interviews: 'I suppose in all sustainability you can only do what you can affect yourself' and this so clearly represents the working reality for many designers. They are just professionals, at work, doing their job. They do have a sphere of influence – and it could certainly be more far-reaching and effective than it is in many cases – but, ultimately, they can only influence what they can influence.

Second, and last, is to mention a distinctly positive aspect to the 'Brundtland' definition of sustainability – that is that sustainability is a *journey.* Some commentators such as Curran (2009) have claimed that 'sustainability is a destination that we aspire to reach…' but that view does not make any sense to me. If sustainability is a destination, then what comes after that? To be sure, targets can be set for sustainability, with the hope of achieving them, but once there the vantage point will surely be even clearer, and further progress can be charted towards the type of 'sustainability' outcomes that will be 'additive' and 'regenerative' to bring about genuinely positive impacts for society, the economy and the environment.

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Appendices

Appendix A: Engagement Letter and Informed Consent Form

Contact Details
Alastair Oliver
Simon Smith
Tim Stratford

Participant Information Sheet and Informed Consent Form
The Institute for Infrastructure and Environment, The University of Edinburgh, School of Engineering
The King's Buildings, Edinburgh, EH9 3JL
Tel: 0131 650 5719

Thank you for your interest in taking part in this research project. The following information briefly explains what the study is about and what your part in it would be. Please take the time to read and understand this information, ask any questions you may have, and consider whether you would like to take part. The last page is an Informed Consent Form which you can then complete, sign, and return to Alastair Oliver.

What is the purpose of the research?
The purpose of this research is to understand the perceptions of sustainability that exist in the Construction Industry. It is the Construction Industry Professionals who bring together the needs of the client with the requirements of Regulations, and a better understanding of this process will help develop insights into the relationship between sustainability policy and practice.

What do I have to do?
Participants are invited to take part in an interview where they will be asked a range of questions relating to their views on sustainability and its associated regulative framework from their perspective as a Construction Industry Professional. While it is preferred that these interviews will take place in person, it will be possible to alternatively arrange to complete the interview by telephone or Skype if that is more convenient. As the interviewee, you will not be expected to travel or incur any costs for your participation other than your time.

Will it take up much of my time?
Each interview is anticipated to last about 45 minutes to an hour.

Who is doing this research?
My name is Alastair Oliver and I am undertaking a PhD in The Institute for Infrastructure and Environment in the University of Edinburgh, where I am supervised by Dr Simon Smith. The study is funded directly by the University of Edinburgh.

Are there any inclusion criteria?
It is expected that you are a Construction Industry Professional currently working in the Industry.

Once I take part, can I change my mind?
Yes. If you would like to withdraw from the study at any point, please inform Alastair Oliver and your details and the information you have provided will be removed. You will not be expected to provide a reason for your decision. Please note that one the results of this study are published, it will no longer be possible to remove the information you have provided from the results.

Engagement Letter and Informed Consent Form Cont'd

What personal information will be required from me?
No more than your job title, role and a basic outline of your everyday responsibilities is required

Will my data be kept confidential?
Yes. All the information you provide, including audio recordings and interview transcripts will be treated in strict confidence and will be anonymous unless it is judged that confidentiality will have to be breached for the safety of the participant or others.

What will happen to the results of the study?
The material obtained in this study will form the published thesis for this PhD and may be incorporated into any resultant journal articles and conference papers both during and after the study.

What do I get for participating?
You will be most welcome to receive an electronic copy of the thesis for this project, subject to any publishing restrictions that may be imposed by the University of Edinburgh. The thesis may be obtained by contacting Alastair Oliver after the thesis is completed.

I have some more questions. Who should I contact?
If you have questions about any aspect of this project, please contact Alastair Oliver directly
. If you have any further concerns, please contact Simon Smith
who is supervising the project.

What if I am not happy with how the research was conducted?
If you are not happy or have any concerns with how the research was conducted, please contact Dr Simon Smith, Senior Lecturer in the School of Engineering (simon.smith@ed.ac.uk)

Appendix B: The ARB Architects Code
(Standards of Professional Conduct and Practice)

As an architect you are expected to:

1. Be honest and act with integrity
2. Be competent
3. Promote your services honestly and responsibly
4. Manage your business competently
5. Consider the wider impact of your work
6. Carry out your work faithfully and conscientiously
7. Be trustworthy and look after your clients' money properly
8. Have appropriate insurance arrangements
9. Maintain the reputation of architects
10. Deal with disputes or complaints appropriately
11. Co-operate with regulatory requirements and investigations
12. Have respect for others

Appendix C: The RIBA Code of Professional Conduct

Principle 1: Integrity

1. Impartiality and undue influence
2. Statements
3. Conflicts of interest
4. Confidentiality and privacy
5. Handling client money
6. Bribery and corruption
7. Criminal conviction /disqualification as a director / sanction

Principle 2: Competence

1. Skill, knowledge, care, ability
2. Terms of appointment
3. Time, cost, quality
4. Keeping the client informed
5. Record keeping
6. Health and safety
7. Inspection services
8. Building performance
9. Heritage and conservation
10. Town and country planning
11. Law and regulations
12. Certification
13. The environment
14. Community and society

Principle 3: Relationships

1. Copyright
2. Previous appointments
3. Peers
4. Equality, diversity and inclusion
5. Modern slavery
6. Employment and responsibilities as an employer
7. Competitions
8. Complaints and dispute resolution
9. Advertising / business names / use of RIBA crest and logo
10. Insurance
11. Non-disclosure agreements
12. Whistleblowing

Appendix D: Transcriptions

Note to examiners: The full transcriptions for the interviews conducted for this research are included on the encrypted USB flash drive that is affixed to the front cover. To help ensure data protection, the password to unlock the drive will be sent to you separately by email.

Following the final submission, transcriptions will be held by the University of Edinburgh in a secure data vault.